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NATO Committee on the Challenges of
Modern Society, Brussels (Belgium)

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PILOT STUDY ON IMPROVING EMERGENCY MEDICAL SERVICES

COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY
COMITE SUR DES DEFIS DE LA SOCIETE MODERNE

CCMS REPORT NO.117

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The Emergency Medical Services Pilot Study is an outgrowth of two earlier pilot studies (NATO) on Road Safety and Advanced Health Care. This report covers the overall objectives of (1) collecting information regarding EMS practices and institutions in NATO nations and other nations who wished to participate, and (2) comparison and evaluation of this information as a basis for recommendations to improve emergency medical services provided to citizens of the participating nations. The five special projects which accomplished this were (1) EMS Survey Project, (2) organization and management of EMS Systems, (3) Communications, First Response and Transportation, EMS Training and Public Education, and (5) Poison Control.

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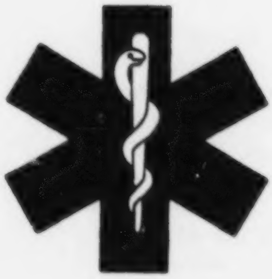

About the cover symbol: The blue "Star of Life" symbol was developed as an alternative to the red or orange Greek cross (which has been restricted by the Geneva Convention for use by or under the authorization of the International Red Cross organization). It is a symbol intended to designate emergency medical care in the civilian sector. Its use on an international basis was proposed at the Emergency Medical Services Project Meeting of the Committee on the Challenges of Modern Society of NATO (North Atlantic Treaty Organization) in May 1975 at Munich, Germany. It is currently in wide use by EMS systems in many countries throughout the world.

FOREWORD

One of the most important challenges faced by governments throughout the free world is how to respond to the ever growing need for prompt, appropriate medical care in emergency situations. The need to improve emergency health care stems from two factors: (1) the rapidly increasing incidence of emergency cases such as cardiac and respiratory conditions as well as accidents of all kinds, particularly traffic accidents, and (2) the increased possibility of saving lives through prompt medical intervention, brought about by recent advancements in several fields of health care.

Since 1971, through participation in several international projects sponsored by NATO's Committee on the Challenges of Modern Society (CCMS), experts in emergency medicine from 21 nations have worked together to meet this challenge.

Between 1971 and 1977, two projects on the subject of emergency medical services were sponsored by the Committee. The first was a project under CCMS's Pilot Study on Road Safety. This EMS project initially focused on finding the most effective ways of responding to victims of motor vehicle accidents -- a problem of global concern since accidents are one of the leading causes of death and the number one cause of death among youth.

The project participants broadened the scope of their efforts because the techniques appropriate to dealing with road accidents are applicable to all critical accidents and illnesses. Another EMS project was therefore activated under the ongoing CCMS Pilot Study on Advanced Health Care.

Together these projects explored ways of improving national and international EMS communications and transport systems, both in urban and rural areas, developed standardized symbols for emergency vehicles and communications, began to frame standards for training and accreditation of emergency medical personnel, studied legal and administrative frameworks for improving emergency care, and explored ways of improving citizen access to the EMS network. All the programs initiated at the national level in the participating nations were developed with the fullest extent of international cooperation.

The CCMS Pilot Study on Improving Emergency Medical Services, which is the subject of this report, is an outgrowth of these two earlier projects. Because of the continued international interest in the work accomplished through the previous international information exchanges and the practical results evident in EMS systems in many countries, NATO elevated the EMS work to pilot study status in September 1978. One year earlier, 45 delegates -- all experts in emergency medical care -- from 14 nations that had participated in the second EMS project urged the Committee to allow them to continue this productive international collaboration in several specific areas under the umbrella of a full-fledged pilot study focused on emergency medical care systems. The United States agreed to serve as lead nation.

Since 1969, the Committee on the Challenges of Modern Society has sponsored twenty-nine "pilot studies" on various areas of worldwide concern of a non-military nature. The pilot studies have all been led by a NATO country. The lead nation accepts responsibility for developing, conducting, and disseminating the results of the work. Both NATO countries and non-NATO countries may participate. The countries share the workload according to their interest and each country is free to choose where to best apply its resources and expertise.

This report summarizes the accomplishments of the nations who have participated in the specific projects in the Pilot Study on Improving Emergency Medical Services, particularly the work done by Canada, France, Italy, Portugal and the United States. These countries served as lead nations of sub-projects, such as an international survey of EMS systems in eleven participating countries and four projects on key aspects of EMS systems such as: the organization and management of the system, training and public education, transportation and communications, and poison control. But all 21 nations contributed to the accomplishments of these studies.

During the past two years of the CCMS/EMS Pilot Study, the World Health Organization's Regional Office for Europe has co-sponsored the study. Since the Pilot Study concludes with the publication of this report, WHO has provisionally agreed to sponsor the follow-up work of the participants, which will continue until 1982. As lead nation of the study, we want to reiterate our enthusiastic thanks for this offer of support. If WHO does become the major sponsor of the follow-up work, many more non-NATO countries, particularly nations in the Third World, will be encouraged to actively participate.

The United States looks forward to continuing its leadership of international efforts to improve national and multinational EMS information exchange throughout the free world. We hope, with the help of all those nations who have worked in this critical area of health care, to meet one of modern society's most difficult challenges -- to diminish the number of deaths, disabilities and long-term suffering that so often results from accidents, injuries and sudden illness.

George I. Lythcott, M.D.
Assistant Surgeon General and
Administrator
Health Services Administration
U.S. Department of Health
and Human Services

December 1980

ACKNOWLEDGMENTS

As the second and final year of the Pilot Study draws to a close, I want to thank all of the people in the international community who have contributed to its success. The research and demonstration projects carried out by the participating nations, which are summarized in the following pages, will undoubtedly have a definitive impact on the state-of-the-art of emergency medical systems throughout the free world for many years to come.

First, I would like to extend my thanks to the governments of the twenty-one nations that have participated in the Pilot Study over the past two years. Their support has made it possible for international experts in emergency medicine to exchange information with colleagues from other nations, host seminars on specific EMS topics, and work on research and demonstration projects that have promoted international action to improve EMS systems in many countries.

I would also like to thank the directors of the Pilot Study's five special projects and those who have assisted them in breaking new ground in key areas of emergency medical care. Their individual efforts during the past two years -- indeed, for almost ten years, in many cases -- have helped to usher in a new era of excellence in international emergency health care.

The project directors join me in expressing thanks to the staff of the Committee on the Challenges of Modern Society (CCMS). They have enthusiastically supported and encouraged international cooperation in this critical area of health care since 1971, when the first EMS project began under the capable leadership of the U.S. Department of Transportation as a part of the CCMS Road Safety Pilot Study. Their commitment continued when the project expanded and became part of the CCMS Advanced Health Care Pilot Study in 1974 and ultimately became a full-fledged Pilot Study on Improving Emergency Medical Services.

All of the participating nations join me in reiterating our gratitude to the World Health Organization for acting as co-sponsor of the present Pilot Study. We look forward to the continued support of WHO's Regional Office for Europe during the follow-up period of the study, 1981-1982. WHOs sponsorship during this period would permit the productive information exchange by international EMS experts to continue unabated and foster the participation of WHO member nations.

Finally, I would like to thank the U.S. State Department, particularly the desk officers and Embassy personnel, for facilitating the many meetings, seminars and other information exchanges that have taken place in Europe and the United States during the last few years in conjunction with this international health project.

William R. Gemma, Ph.D.
Chairman
NATO/CCMS Pilot Study on Improving
Emergency Medical Services

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An ***emergency medical services system*** *is a network of services providing for the detection and reporting of medical emergencies, care at the scene, transport and care enroute to the hospital, and reception and immediate care of the patient at the hospital.*

CHAPTER

1

BACKGROUND OF THE CCMS/EMS PILOT STUDY

In September 1978, officials of the North Atlantic Treaty Organization (NATO) approved a proposal to accord pilot study status to a project on emergency medical services that had formerly been a part of two other pilot studies sponsored by NATO's Committee on the Challenges of Modern Society. This chapter discusses the Committee's role in the evolution of the Pilot Study on Improving Emergency Medical Services and the two projects from which it emanated, the Road Safety Pilot Study and the Advanced Health Care Pilot Study.

COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY

The Committee on the Challenges of Modern Society (CCMS) was created in April 1969 as the North Atlantic Treaty Organization (NATO) celebrated its twentieth anniversary.

Meeting in Washington in commemorative session on April 10, 1969, the NATO Foreign Ministers heard President Nixon describe the Alliance as it entered its third decade. It was, he said "by its nature ... more than a military alliance; and the time has come to turn a part of our attention to those non-military areas in which we could benefit from increased collaboration."

These remarks introduced a United States proposal to create a committee on the challenges of modern society. This committee would explore ways in which the experience and resources of the Western nations could most effectively be used to improve the quality of life. This would be NATO's third dimension -- a social dimension that would join a strong military dimension and a profound political dimension.

From its beginning, the Committee on the Challenges of Modern Society (CCMS) has operated differently from other international organizations. Its work is characterized by four policies that have been essential to CCMS from its outset.

- First, CCMS does not work through an international staff and with a fixed budget; its work is undertaken by member countries acting as pilot countries for particular projects. Working with other interested member countries (and, over the years, with many countries not members of the North Atlantic Treaty Organization), each pilot country is responsible for developing, conducting, and disseminating the results of a pilot study. Co-pilot countries and other participants share the work load according to their interest. No member is required to participate in any study; on the contrary, each country is free to choose where to best apply its resources and expertise. Results, on the other hand, are available to all.

In February 1972, a working session of the project was held in Brussels. After reviewing the results of the first questionnaire, the group formulated a small supplementary questionnaire consisting of 19 elements. Results of this latter effort led to the idea that a vastly expanded evaluation methodology might be developed for application at the national level.

- Early Project Results

  In May 1972, the leaders of the various projects comprising the Road Safety Pilot Study addressed a public meeting in Washington, D.C. Dr. Guiseppe Spalatin, the EMS Project leader from the Italian Ministry of Health, reported the results of an analysis of the questionnaire.

  The report showed that, among other deficiencies, in almost all the responding nations there was neither an established, centrally-directed national policy, nor a pre-arranged program for the development of emergency medical services. Moreover, operative responsibilities were not integrated. Rather, they were generally shared among several agencies -- state and local authorities, voluntary non-profit organizations -- all active in the field and without any apparent overall coordination. Other deficiencies noted were: EMS funds were not nationally adopted according to real needs; EMS vehicles and equipment and training for EMS personnel were at best only partially standardized; communication between hospitals and ambulances was practically non-existent; and very little research in first-aid services was being done. (For a complete account of Dr. Spalatin's findings, see the final report of the EMS Project, CCMS Report No. 22, published in March 1974.)

  During the first few years of the project, Dr. Spalatin did the bulk of the work. He travelled extensively in search of data and other information. Other people in the participating nations who contributed to the study were Mr. Rene Coirier of the Government of France, who was especially helpful in his willingness to provide information and to read and comment on much of the material which the project workers developed. Others who made valuable contributions include Dr. Eduardo do Amaral of Portugal and Dr. Jurgen Killian and Mr. Walter Teuber, both of the Federal Republic of Germany. Dr. William R. Gemma, Chairman of the current EMS Pilot Study, also rendered invaluable time and effort to the project.

- Second EMS Project Activated

  In early 1972, a second Emergency Medical Services Project was activated under the CCMS Advanced Health Care Pilot Study. Very close liaison was maintained between the two to prevent duplication or competitive efforts. The goals and accomplishments of the second EMS project will be discussed later in this Chapter. In October of 1972, the project leaders agreed that the EMS Project under the Road Safety Pilot Study should continue to develop the evaluation methodology until the Spring of 1973. At that time and with the final Project Report, all EMS activity would be phased into the Advanced Health Care Pilot Study.

- Second, CCMS has always emphasized projects that would guide policy formulation and stimulate domestic and international action. While often identifying new areas for research in its "action orientation," CCMS has sought to make the results of research accessible to policy makers.

- Third, CCMS is an outward-looking and open organization. Through this policy of open participation, non-NATO countries have been able to participate directly in its work or, through ad hoc or other organizational arrangements with individual NATO countries, to share information and benefit from material generated by CCMS. For example, faced with many more urgent global health issues, the World Health Organization (WHO) has never been able to devote a major portion of its resources to emergency medical services (EMS). CCMS work in this area may today apply only to a few countries, but in the future, as EMS programs develop in the Third World, many more countries will benefit from these efforts.

- Finally, CCMS has developed a follow-up procedure, indicative of the Allies' concern for the role CCMS should play in national and international environmental activities. Each pilot country assumes the responsibility of ensuring that its study play the most important role in stimulating national and/or international action. Formal follow-up procedures require the pilot country to report to the CCMS Fall Plenary for two years following submission of the final pilot study report on how the results and recommendations are being implemented.

These four concepts -- the pilot country leadership, stimulation of national and international action, open participation and results, and follow-up -- are the essential components of CCMS. Together, they make a unique forum for international cooperation.

ROAD SAFETY PILOT STUDY

At the first meeting of the CCMS, the United States proposed that the problem of road safety be studied by the Committee. This proposal was accepted by NATO. The National Highway Traffic Safety Administration of the U.S. Department of Transportation took lead responsibility for the study.

The Road Safety Pilot Study was divided into seven independent projects, each led by a NATO ally:

- Pedestrian Safety -- Belgium
- Alcohol and Highway Safety -- Canada
- Motor Vehicle Inspection -- Federal Republic of Germany
- Identification and Correction of Road Hazards -- France
- Accident Investigation -- The Netherlands
- Experimental Safety Vehicle -- The United States
- Emergency Medical Services -- Italy.

CHAPTER
1

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- U.S. Develops EMS Evaluation Methodology

Subsequent to the various project activities reported by Dr. Spalatin, the U.S., as Pilot Country, developed a methodology with which a national, state, or local government might evaluate its EMS programs.

One reason for a deficiency in emergency medical services, in fact, is the difficulty in developing an acceptable method for evaluating established EMS systems. This difficulty stems from problems encountered in assessing the quality of medical care in any aspect of a health care delivery system, including, but not limited to: (1) accessibility to the system; (2) availability of quality health services; (3) adequacy of care rendered; (4) comprehensiveness of the system; and (5) finances to ensure continuity and improvements in the delivery of urgent medical care.

Traditionally, EMS systems have been evaluated by measuring such resources as ambulances, personnel, equipment, training courses and communications against government published and recommended EMS standards. However, this tells little of total system effectiveness; that is, how many fatalities have been prevented and how many serious injuries are mitigated.

An analysis of the answers received in the initial EMS questionnaire sent by Dr. Spalatin pinpointed certain obstacles to a successful EMS evaluation methodology. It became evident that the objectives for which the evaluation methodology is designed, as well as the techniques and guidelines relating to how and where to use the methodology, needed to be clearly spelled out.

With this in mind, the original questionnaire developed by the Italian government was reorganized by arranging the questions into categories representing system elements and sub-elements. This reorganization allowed each element in the EMS system to be evaluated separately. Additional items were included to give a more comprehensive description of the EMS organization, the resources, and the procedures utilized. This methodology was then field tested in several locations in Europe and in the United States.

The evaluation methodology ultimately developed under the CCMS Road Safety Pilot Study by the U.S. represented an effort to define a comprehensive framework for EMS systems analysis, evaluation and decision-making. Within this framework, the impact of the EMS system was identified, quantified, and evaluated.

The results of the evaluation were designed to be used by local administrators and health officials in determining the effect and capability of their existing services and the cost of existing or planned changes. (For a complete presentation of the evaluation methodology, see Section II of the above cited CCMS Report No. 22.)

As previously noted, the methodology was tested in a preliminary way through field visits. Discussions with health and transportation officials in several nations, notably the Federal Republic of Germany and Belgium, further refined the procedures. Despite the fact a complete application of the methodology was not made, the Pilot Study team concluded that the technique could be helpful in planning and implementing EMS systems and improving these systems at the national, regional, or local levels.

This team effort was the first attempt ever made to collect and evaluate all aspects of an EMS system and make the data available to appropriate officials in a single, comprehensive report. Although the evaluation methodology was developed to aid victims of traffic accidents, it also focused on the emergency medical services provided in other medical crises, such as heart attacks, acute illnesses, and trauma. Obviously, a community EMS system must respond to all urgent medical situations whether located on the highway or elsewhere. Moreover, any comprehensive EMS system must extend beyond the threshold of the hospital emergency room to aspects of subsequent definitive treatment.

The Pilot Study team pointed out that the need to upgrade EMS was apparent throughout the United States and other countries. Applications of the evaluation methodology, even in its preliminary form, they concluded, was a necessary first step for communities, states, and nations in identifying the most cost-beneficial ways of increasing the efficiency and effectiveness of their systems. Knowledge of outstanding techniques,equipment, facilities, and procedures gained through the results of applying the methodology, they pointed out, should be made available to officials planning or contemplating changes to their existing EMS systems.

- Recommendations

The first EMS project officially ended when it was merged into the CCMS Advanced Health Care Pilot Study. It concluded with fifteen recommendations for continuing international efforts to improve the state-of-the-art of emergency health care delivery under the ongoing EMS Project of the Advanced Health Care Pilot Study.

The recommendations were as follows:

1. The evaluation methodology be accepted as the international standard.
2. The Allies conduct a definitive analysis of their EMS systems using the evaluation methodology developed under this project.
3. Once these analyses are complete, an international exchange of the results of the application of the methodology be made.
4. The evaluation methodology be expanded to include the hospital elements of the system since the earlier efforts concentrated solely on the external (to the hospital) response system. As a model may be improved by advanced versions, including more detailed analysis of the hospital role in emergency care, expanded tests be conducted.
5. Each nation assess its training efforts for both professionals and paraprofessionals, noting proficiency requirements rather than curricula alone.

It was further recommended that the Advanced Health Care Pilot Study consider:

1. A program of interchange of personnel with expertise in EMS in order to gain better insight into world happenings in the field.
2. The desirability and feasibility of a universal EMS language. If found feasible, plans for its development should be formulated and implemented.
3. A continuing effort among nations to develop and standardize both the basic and the advanced levels of training for paramedical personnel.
4. An international effort to standardize design, configuration, and medical equipment of ambulances. Included should be a study of mobile intensive care units.
5. A program to study, describe, and if possible, unify the various radio frequencies being utilized to voice and telemetric communications within the emergency medical services function.
6. A program of appropriate research and development on the worldwide problem of early detection of accidents and sudden illness.
7. The monitoring of national EMS projects with a view toward worldwide implementation where advances occur.
8. A joint comparative study between a nation which routinely dispatches a physician to a crash-site (e.g., France) and a nation which routinely dispatches only paramedical personnel (e.g., U.S.) in order to resolve the basic question of need.
9. A cost benefit study for an operational central dispatch system.
10. A cost benefit study for the use of helicopters on a national basis.

CCMS ADVANCED HEALTH CARE PILOT STUDY

The CCMS Advanced Health Care Pilot Study began in 1971. Its four projects, one of which was a second EMS Project, investigated issues of modern health management in which little international work had been done.

- The Second EMS Project

  The second EMS Project was activated as part of the CCMS Advanced Health Care Pilot Study early in 1972. Italy, Portugal, and the United States served as the lead countries. Belgium, Canada, Denmark, France, the Federal Republic of Germany, Greece, Iceland, Luxembourg, the Netherlands, Norway, the United Kingdom, Spain, and the International Red Cross participated. Dr. Rosa D'Andrea of Italy, Dr. Eduardo do Amaral of Portugal, and Dr. William Gemma of the United States were the project leaders.

  This second EMS project within NATO dealt with efforts to aid victims who need urgent medical treatment for such conditions as heart attacks, burns, industrial and home accidents, and all types of sudden illnesses. Close liaison was established between the two projects to prevent duplication of effort and to ensure a smooth transition of the EMS activity upon completion of the Road Safety Pilot Study into the more general EMS effort under the Advanced Health Care Pilot Study.

The scope of the second EMS project necessarily evolved from one with a narrow focus on a highly developed and unique program to one with a broader view of the roles various institutions and organizations play in the delivery of urgent medical care, and other aspects of pre-system and system activity. It basically focused on developing and promoting an EMS system that would cut across all segments of society and societal institutions, and cover all kinds of emergency situations.

The overall guidelines for the second EMS project were developed at an international EMS meeting, held in San Francisco in October of 1972. Subsequent meetings were held in Lisbon in 1973 and in Rome in 1974, where work groups planned and designed the basic components of a feasible and workable EMS system.

All this activity was brought together in May of 1975 at the International EMS Conference in Munich, Germany, where a consensus of the participating countries formed the basis for the final report on the EMS project. This conference was the largest of all the meetings of the Committee on the Challenges of Modern Society. Delegates from 15 countries and members of the International Red Cross attended.

- Conclusions and Recommendations

The delegates attending the Munich meeting unanimously agreed upon a set of definitions for the four essential elements of sub-systems required in a viable emergency medical system. It is believed that such a system can be adapted to any level of governmental organization--local, regional, or national. These four sub-systems are:

- Detection--recognition and assessment of an unforeseen event
- Notification and Coordination--this entails the call for help and communication with an ambulance service and hospital
- Organization of the EMS system--this includes the participation, performance, and training of all key organizations and people involved in the system
- Emergency Medical Treatment--the provision of emergency medical treatment that will increase the chance of survival and minimize the effects of injury or illness

A deep concern expressed by the delegations at Munich was the need for improving existing systems, especially the need to help fragmented and uncoordinated systems develop into a comprehensive and unified emergency medical services program. The major objectives for achieving these improvements were set forth as follows:

- Training of all medical personnel
- Upgrading of transportation vehicles and emergency equipment
- Communications
- Training of the general public on how to use the EMS system

The Conference agreed that while any one of the four defined sub-systems could assume the highest priority for improvement at any one time, no sub-system should be addressed in isolation, ignoring mutual impacts and interactions with other sub-systems. Assessment of the EMS system, they concluded, was required to discover these interrelationships and to recognize specific problem areas. Again, then, the participating nations stressed the importance of the assessment methodology that had been developed over the previous three years.

To effectively share and transfer EMS knowledge and expertise requires a continuing international mechanism. Therefore, the conferees recommended that appropriate officials be brought together periodically to exchange information, perhaps in the context of an EMS forum. At such a forum participants would exchange ideas, share experiences, and make further recommendations for upgrading EMS systems throughout the world.

The Munich delegates specifically recommended that follow-up conferences be held in Baltimore, Maryland in 1976 and in Montpellier, France in 1977 to ensure that international cooperation continued and that the participating nations established a continuing mechanism to foster the sharing of knowledge and experiences in the field of emergency medicine.

As part of this thrust toward improved international communication and cooperation, the Munich delegates made several other recommendations.

At the national level, these included the collection and dissemination of data, the utilization of the assessment methodology, the expansion of training programs, and also, the development and implementation of national standards of performance.

On an international scale, the recommendations called for: (1) standardization of EMS terms and procedures; (2) development of common performance standards; and (3) cooperative investigative activities on priority EMS issues.

Selected topics such as disaster planning for harbor and airport medical emergencies, and EMS communication for basic and advanced life support systems, were recommended for further consideration by the delegates.

- Follow-Up Activities

At the 1976 meeting in Baltimore, the project participants had the opportunity to participate in the USA Bicentennial Emergency Medical and Traumatology Conference and witness an exhibition which attracted almost 3,000 participants. One of the conference highlights was the test of the Baltimore City and Port Authority Disaster Plan and processing of 350 disaster casualties from a simulated explosion on a ship in Baltimore Harbor. The knowledge gained from this simulation undoubtedly helped the delegates to update their disaster plans.

At the September 1977 Montpellier meeting, the last of the follow-up meetings of the EMS Project under the Advanced Health Care Pilot Study, the delegates addressed three items:

1. Reports from national delegates on EMS progress in their home countries and on the status of the implementation of recommendations in the Munich report.

2. Discussion of special agenda items on the cost of EMS systems, the effectiveness of EMS systems, the EMS symbol for emergency vehicles (the "Star of Life"), pediatric emergencies, and qualifications and training for EMS technicians.

3. Consideration of the future of EMS project activities, including the possible involvement of the World Health Organization's Regional Office for Europe (Copenhagen).

The delegates at the Montpellier Conference concluded that there was a continued need for exchange of ideas and information on a recurring basis to improve accessibility and availability of emergency medical services throughout the world.

It was unanimously recommended that the work of the CCMS/EMS activities continue and that the current project be jointly sponsored by NATO/CCMS and the WHO. Additionally, because of the many new ideas and problem areas that were of interest to the participating nations in this area, it was suggested that the project be elevated to pilot study status under the chairmanship of the United States.

One year later, in September 1978, NATO approved the Pilot Study on Improving Emergency Medical Care.

On the next four pages is a chronological account of the milestones of the EMS activities sponsored by the Committee on the Challenges of Modern Society that ultimately led to the present EMS Pilot Study. (See Exhibit 1-A).

Exhibit 1-A(1)

MILESTONES IN THE CCMS/NATO STUDIES TO IMPROVE EMERGENCY MEDICAL CARE WORLDWIDE

DATE	PLACE	MILESTONES	COMMENTS
August 1971	Brussels, BELGIUM	The CCMS/NATO Road Safety Pilot Study activates a project focused on improving emergency aid to traffic victims. This EMS project, one of seven initiated by the Pilot Study, was the forerunner of the 1978-80 EMS Pilot Study, the subject of this report.	The EMS Project, with Italy as the lead nation, begins developing a comprehensive questionnaire to solicit information on national policies and programs to aid accident victims. The purpose of the project was to exchange information on certain medical practices and procedures that respondents considered to be effective in caring for accident victims.
February 1972	Brussels, BELGIUM	At a joint working session of two CCMS Pilot Studies (Road Safety and Advanced Health Care), participating nations decide to activate a second EMS project to explore all aspects of emergency medical services not specifically related to road safety. Italy and Portugal agree to serve as lead nations.	Members of the first EMS Project review questionnaire responses from Canada, Denmark, Germany, France, the Netherlands and the USA. An expanded questionnaise is prepared, which leads to the idea that a vastly expanded questionnaire could be the basis for a method of evaluating an EMS system.
May 1972	Washington, D.C., USA	EMS Project Leader gives a progress report on Emergency Medical Care Project at a public meeting of the CCMS Road Safety Pilot Study. (See CCMS Report No. 22 for text of presentation.)	Model EMS system defined in five phases. Twelve special areas of interest for further research and practical testing are identified. Results of questionnaires from eight countries (Belgium, Canada, Denmark, France, Federal Republic of Germany, Italy, the Netherlands, and the USA) are presented.
September 1972	USA and several locations in Europe	EMS Project Team develops and makes preliminary field tests of a methodology for evaluating the effectiveness of an ongoing EMS system at the national, state, regional, or local level.	An evaluation methodology developed by the U.S. government is refined and tested in Europe and in the USA.
October 1972	San Francisco, CA, USA	Members of both EMS Projects attend the meeting of the CCMS Advanced Health Care Pilot Study.	Advanced Health Care Pilot Study members develop overall guidelines for the second EMS Project, and recommend refinements and further testing of the evaluation methodology, which was pretested by the Road Safety Pilot Study project team. The recommendation is approved by Belgium, Canada, Denmark, France, Germany, Greece, Italy, the Netherlands, Portugal, the United Kingdom, and USA.
December 1972 - January 1973	USA	Final field tests of EMS evaluation methodology in Pennsylvania, New York and Georgia.	State Health Departments in these states test the validity of the evaluation methodology.
March 1973	Lisbon, PORTUGAL	Work conference of EMS Project in Advanced Health Care Pilot Study.	Representatives of the Federal Republic of Germany, Italy, Portugal, the United Kingdom and the USA develop plans for an international work conference of experts on various aspects of emergency medical care.
April 1973	Brussels, BELGIUM	Final report of EMS Project under the Road Safety Pilot Study drafted. EMS Project continues under the Advanced Health Care Pilot Program.	Report discusses a technique for measuring the effectiveness of EMS systems in member countries using five criteria: organization, personnel, equipment, operational procedures, and records and statistics.
February-March 1974	EUROPE	EMS Project Chairman visits EMS experts in nine European countries.	The Chairman gives a progress report to members of the project team from Belgium, France, Germany, Italy, Hungary, Norway, Portugal, Switzerland and the United Kingdom.

Exhibit 1-A(2)

MILESTONES IN THE CCMS/NATO STUDIES TO IMPROVE EMERGENCY MEDICAL CARE WORLDWIDE

DATE	PLACE	MILESTONES	COMMENTS
March 1974	Brussels, BELGIUM	Final Report of EMS Project under Road Safety Pilot Study published (CCMS Report No. 22).	Report makes 15 recommendations, including 10 suggesting follow-up tasks for continuing EMS Project under Advanced Health Care Pilot Study.
April 1974	Rome, ITALY	Thirty delegates from ten countries define four essential elements for an effective EMS system.	Delegates define the four essential system components as detection, notification and coordination, organization of the system, and treatment. This methodology is the first ever for evaluating all aspects of an EMS system so that government officials can examine total system in a comprehensive report. Delegates stress the importance of applying assessment methodology for the evaluation of EMS systems to improve or expand capabilities.
May 1974	Ottowa, CANADA	EMS Project Chairman speaks at the Scientific Conference on Traffic Safety.	Chairman presents "An Evaluation Methodology for EMS" to an international audience.
October 1974	Brussels, BELGIUM	At Fall Plenary of CCMS, a draft of the Advanced Health Care Pilot Study final report is issued for review by participating nations.	Report makes eight recommendations for national action, stressing use of assessment methodology at local, regional and national level, and five recommendations for continuing international information exchange on EMS techniques and procedures.
May 1975	Munich, GERMANY	Delegates from 15 countries and the International Red Cross attend the final (and largest) meeting of EMS Project under the Advanced Health Care Pilot Study. Denmark, Greece, Iceland, Luxembourg and the Netherlands participate for the first time.	Conference participants identify four major objectives to achieve comprehensive and unified EMS systems: (1) training of all medical personnel, (2) upgrading of transportation vehicles and emergency equipment, (3) strengthening of communications, and (4) public education. To make information on exemplary EMS systems available to other nations, delegates agreed to schedule an International EMS Forum.
October 1975	Brussels, BELGIUM	Fall Plenary of CCMS.	EMS Project Chairman present program report. Use of blue "Star of Life" symbol is proposed. Symbol will be used for civilian emergencies.
October 1975	Fagernes, NORWAY	Scandanavian Conference on EMS.	Norwegian Society of Chartered Engineers convenes EMS Conference to apply and implement the conclusions and recommendations of 1975 Munich meeting.
March 1976	Los Angeles, CA. USA	EMS Project Chairman speaks at meeting of Urban/Metropolitan Emergency Medical Services.	Chairman recaps progress of both CCMS Projects.
April 1976	Brussels, BELGIUM	Final Report of CCMS Advanced Health Care Pilot Study (CCMS Report No. 43) is published.	Recommendations for national action and international cooperation to improve EMS systems are reported.
May 1976	Baltimore, MD, USA	International EMS Conference, the first follow-up meeting of EMS Project is hosted by USA as part of the official observance of the Bicentennial Anniversary.	Participants discuss recommendations of 1975 Munich Plenary, which included: (1) standardization of EMS terms and procedures, (2) development of common performance standards, and (3) cooperative investigative activities in priority EMS issues.
December 1976	Rome, ITALY	First National Congress on Emergency Medical Care.	EMS Project Chairman and Director of EMS Services in the USA make presentations. Delegates recommend greater cooperation in information exchanges and stress need for an international forum to assess EMS recommendations.

Exhibit 1-A(1)

MILESTONES IN THE CCMS/NATO STUDIES TO IMPROVE EMERGENCY MEDICAL CARE WORLDWIDE

DATE	PLACE	MILESTONES	COMMENTS
April 1977	Copenhagen, DENMARK	Representatives of the World Health Organization's Regional Office for Europe and CCMS/EMS Project officials meet.	Officials explore possibility of future cooperation between EMS Project and WHO.
September 1977	Montpellier, FRANCE	Final follow-up meeting of the Advanced Health Care EMS Project. EMS Project elevated to Pilot Study status, with USA serving as lead nation.	Forty-five delegates from 14 countries and the WHO attend. Countries participating are: Belgium, Canada, Denmark, England, Germany, France, Italy, Luxembourg, New Zealand, Norway, Portugal, Spain, Switzerland, USA and WHO Regional Office for Europe.
March 1978	Brussels, BELGIUM	CCMS/EMS Pilot Study Chairman submits progress report at CCMS Spring Plenary Session.	Delegates recommend the following eight sub-project activities: pathophysiology effects of EMS transportation, poison control and intervention, disaster planning, organization and management of EMS systems, utilization of air transportation and EMS communications, survey of emergency medical services, EMS training at the university level, and function of the medical doctor in different patterns of emergency medical help (organization-financial and economic aspects).
April 1978	Wiesbaden GERMANY	CCMS/EMS Pilot Study Planning Meeting, attended by Canada, France, FR of Germany, Italy, The Netherlands, Portugal and the USA.	Fourteen experts from these seven nations develop proposal for Pilot Study for submittal to CCMS in collaboration with WHO.
September 1978	Brussels BELGIUM	NATO Council approves EMS Pilot Study under leadership of USA.	Five sub-projects are approved for investigation, with the following countries acting as lead nation: (1) EMS Survey-Canada, (2) Organization and Management of EMS Systems-USA, (3) EMS Training-Italy and Portugal, (4) EMS Transportation and Communications-France and (5) Poison Control-Italy.
October 1978	Rio de Janeiro, BRAZIL	EMS Pilot Study Chairman makes presentation before the Seventh International Symposium on Acute Care.	Paper entitled "International Activities for the EMS Pilot Study" is delivered.
January 1979	Bethesda, MD, USA	First meeting of the Executive Committee of NATO/WHO/CCMS Pilot Study on Improving Emergency Medical Services.	Twenty-eight delegates from seven countries (Brazil Canada, Columbia, France, Italy, Portugal, the USA) the Pan American Health Organization and the World Health Organization's Regional Office for Europe meet to plan activities for next two years. They develop specific work plans in five sub-project areas and draft survey questionnaire.
February 1979	Toulouse, FRANCE	EMS experts from sixteen countries attend a technical group meeting sponsored by WHO.	The discussion centers on the planning and implementation of emergency medical services and accident prevention programs throughout the world. The forum provides an opportunity for some of the EMS Pilot Study participants to collaborate with experts from countries throughout the world and discuss the five EMS project study areas (see September 1978 comment). Methods of coordinating project activities with WHO are also explored.
April 1979	Monte Carlo, MONACO	EMS Pilot Study experts attend CCMS Spring Plenary Session,held in conjunction with Third International Conference on Disaster Medicine.	Delegates discuss five EMS sub-projects of Pilot Study and make plans for dispatching the EMS survey questionnaire.

Exhibit I-A(4)

MILESTONES IN THE CCMS/NATO STUDIES TO IMPROVE EMERGENCY MEDICAL CARE WORLDWIDE

DATE	PLACE	MILESTONES	COMMENTS
October 1979	Washington, D.C., USA	CCMS Tenth Anniversary Plenary, held at the U.S. Department of State.	Results of the Toulouse and Monte Carlo meetings are presented. Endorsement of EMS Pilot Study's work by WHO and the U.S. National Academy of Sciences is reported.
March 1980	Rockville, MD, USA	Chairman hosts Second Annual Meeting of EMS Pilot Study Executive Committee.	Executive Committee lays out plans for its five subprojects and establishes preliminary agenda for Pilot Study Working Session in Munich.
September 1980	Munich, GERMANY	Final Working Session of CMS/EMS Pilot Study, attended by 40 delegates from 16 countries.	Delegates recommend follow-up action at national and international level. WHO makes provisional commitment to sponsor follow-up work, and delegates plan World Assembly on Emergency Medical Services for USA in Fall 1981.

CHAPTER
2

CCMS/EMS PILOT STUDY:
OBJECTIVES, PROJECTS AND ACCOMPLISHMENTS

INTRODUCTION

The 1977 follow-up meeting of the EMS sub-project under the CCMS Advanced Health Care Pilot Study set the stage for the current Pilot Study on Improving Emergency Medical Services. This meeting, held in Montpellier, France, in September, was attended by 45 EMS experts from 14 nations.

The overall conclusion of the delegates was that despite the progress made over the previous seven years, much more work was needed to be done to improve the accessibility and availability of emergency medical services throughout the free world. It was the consensus of the participants that there was a critical need to continue the valuable information exchange activities that had taken place under the EMS project.

The delegates therefore proposed that the EMS project activities be elevated to Pilot Study status under the co-sponsorship of NATO Committee on the Challenges of Modern Society and the World Health Organization. The United States was to serve as lead nation.

The reasons for advocating the co-sponsorship of these two international organizations were the following:

CCMS is the only known international mechanism dealing with the entire spectrum of urgent medical care delivery systems. Other organizations are concerned primarily with disaster planning and worldwide relief in situations involving natural and man-made disasters. Through CCMS, instead, many nations, even non-NATO nations, had been able to deal with issues specifically related to emergency medical care. For example, they had examined specific aspects of EMS systems such as communications, transportation, treatment at the scene of accidents, and care in emergency departments of medical aid facilities.

The World Health Organization, which was represented at the Montpellier meeting, had an interest in sponsoring further study of emergency medical care, particularly care for the victims of traffic accidents. WHO had recently embarked on a worldwide program dealing with vehicle accidents and was considering expanding the program to investigate all types of accidents. WHO special concern about vehicle accidents reflected the global concern of public health authorities about the ever increasing number of traffic deaths and injuries.

The delegates' recommendations were approved by NATO the following year and the EMS Pilot Study was formally initiated in the fall of 1978.

STUDY OBJECTIVES

The overall objectives of the EMS Pilot Study, as defined at the 1977 Montpellier meeting, were:

- To collect information regarding EMS practices and institutions in NATO nations and other nations wishing to participate.
- To compare and evaluate this information as a basis for recommendations to improve emergency medical services provided to the citizens of the participating nations.

Five sub-projects were identified to fulfill these objectives, including a survey of emergency medical services to collect basic data that would help the participants plan and evaluate their EMS delivery.

SPECIAL PROJECTS

Much of the work done by the EMS Pilot Study during the past two years has focused on five sub-projects, which were formally defined at the first meeting of the Executive Committee in January 1979. The project titles, objectives, and lead nations are listed below.

- EMS Survey Project (Canada): To collect and disseminate information that may be used to plan, implement, and evaluate advances in EMS systems and to provide basic information for use by other projects of the CCMS/EMS Pilot Study.
- Organization and Management of EMS Systems (USA): To establish criteria for organizing and managing national and international EMS programs and to establish a methodology for evaluating the effectiveness/efficiency of these systems.
- Communications, First Response and Transportation (France): To study, assess, and recommend minimum international standards for the transportation and communications components of EMS systems.
- EMS Training and Public Education (Italy and Portugal): To develop a multinational training program plan for EMS personnel, and to develop a public information and education program.
- Poison Control (Italy): To study, assess, and recommend minimum international standards for acute poisoning prevention and intervention.

A more complete description of these five projects, including the names of the project leaders and the study areas, is presented in Exhibit 2-A on the following pages. In addition, Chapters 3 to 7 discuss the methodology and the highlights of the work accomplished by each of the projects over the past two years. The recommendations of the Pilot Study delegates regarding each of these projects are included as well.

Exhibit 2-A(1)

DESCRIPTION OF MAJOR PROJECTS IN EMS PILOT STUDY

NO.	NAME OF PROJECT	LEAD NATION	PROJECT DIRECTORS
1	INTERNATIONAL SURVEY OF EMS SYSTEMS	Canada	Mrs. Lorraine Davies (Co-Chairman), Director, EMS Department of National Health and Welfare; and Mr. David Martin (Co-Chairman), Telehealth Coordinator, and Consultant in Hospital Administration, Department of National Health and Welfare.
2	ORGANIZATION AND MANAGEMENT OF EMS SYSTEMS	USA	Dr. David Boyd, (Chairman), Director of Division of EMS, Bureau of Medical Services, Health Services Administration, Department of Health and Human Services; and Mr. John Otten, Technical Advisor to DHHS Region V for EMS.
3	COMMUNICATIONS, FIRST RESPONSE, AND TRANSPORTATION	France	Professor Maurice Cara (Co-Chairman), Chief Medical Officer, SAMU, Necker Hospital, Paris; and Mr. Rene Coirier, (Co-Chairman) Ministry of Health
4	EMS TRAINING AND PUBLIC EDUCATION	Italy/ Portugal	Professor Corrado Manni (Co-Chairman), Director, Reanimation Center Instituto di Anestesiologia e Rianimazione; and Dr. Eduardo do Amaral (Co-Chairman), Director, Service de Medicina, Operatoria, Faculty of Medicine, Universidade de Lisboa
5	POISON CONTROL	Italy	Professor Sergio Magalini (Chairman), Director, Antivenom Center, Instituto di Anestesiologia e Rianimazione

Exhibit 2-A(2)

PROJECT OBJECTIVES	STUDY AREAS
• To collect and disseminate information that may be used to plan, implement, and evaluate advances in EMS systems, and to provide basic information for use by other projects in the CCMS/EMS pilot study.	The following type of information was solicited from participating nations concerning their EMS systems: (1) EMS authority/responsibility, (2) regional programs, (3) laws and regulations, (4) public education, (5) emergency communications, (6) ambulances and other emergency vehicles, (7) hospitals, (8) EMS personnel and training, (9) EMS data collection, (10) disaster plans, (11) special system features, (12) special needs. Questionnaires were circulated and the information compiled and analyzed for this report. (See Appendices A and B.)
• To establish criteria for organizing and managing national and international EMS programs. • To establish a methodology for evaluating the effectiveness/efficiency of these systems.	The following aspects of national and regional EMS programs were reviewed in order to develop standards for national and international EMS systems: system administration, organization, the role of government, legislation, system design components, data collection and system evaluation, regional management, and a system for categorizing patients based on the nature and severity of their illnesses.
• To study, assess, and recommend minimum international standards for the transportation and communications components of EMS systems.	Various components of transportation and communications systems (vehicles, operations, and support equipment) to expedite pre-hospital and hospital emergency medical care were studied. The project also examined ways of matching available resources with the demands for emergency medical services.
• To develop a multinational training program plan for EMS personnel. • To develop a public information and education program.	Various programs and techniques for educating the public and public emergency personnel (police and fire) in first-aid and simple life-saving techniques were studied and tested, using different media. The project team proposed training programs and standards for all those delivering EMS services (ambulance drivers, rescue personnel on helicopters and ships, nurses, and medical students) as well as post-graduate programs for physicians handling acute medical situations. In addition, legislative actions for implementing basic EMS instruction in elementary schools, driver education programs, and industry were studied.
• To study, assess and recommend minimum international standards for acute poisoning prevention and intervention.	Poison control systems in participating nations were studied to establish: (1) basic protocol for data storage, recall and display; (2) treatment protocols; (3) parameters for system access, utilization and education of health care providers and the general public; (4) administrative, organizational and personnel considerations of the poison control system at the regional and treatment level; and (5) improvements in clinical toxicology, and computerized and noncomputerized poison control information systems.

STUDY ACCOMPLISHMENTS

During the past two years, the EMS Pilot Study has succeeded in reaching its objectives, not only through the considerable accomplishments of the individual projects but through the active international exchange of information that has occurred among the participants on many aspects of emergency medical care. In fact, to date, twenty-one nations have participated in various activities initiated by the study. In addition to the five nations that have led the projects listed above (Canada, France, Italy, Portugal and the United States), the following nations have worked with the project teams or attended group policy-making meetings:

- Belgium
- Brazil
- Colombia
- Denmark
- Egypt
- Greece
- Iceland
- Lebanon
- Luxembourg
- The Netherlands
- New Zealand
- Norway
- Spain
- Switzerland
- United Kingdom
- West Germany

The graph below indicates the growth in the number of participating nations since the first EMS Project began in 1971 under the CCMS Pilot Study on Road Safety.

In addition, NATO's Committee on the Challenges of Modern Society, the World Health Organization's Regional Office for Europe, the Pan American Health Organization, the International League of Red Cross Societies, and the U.S.

GROWTH IN INTERNATIONAL PARTICIPATION IN CCMS-SPONSORED EMS STUDIES

(1971-1980)

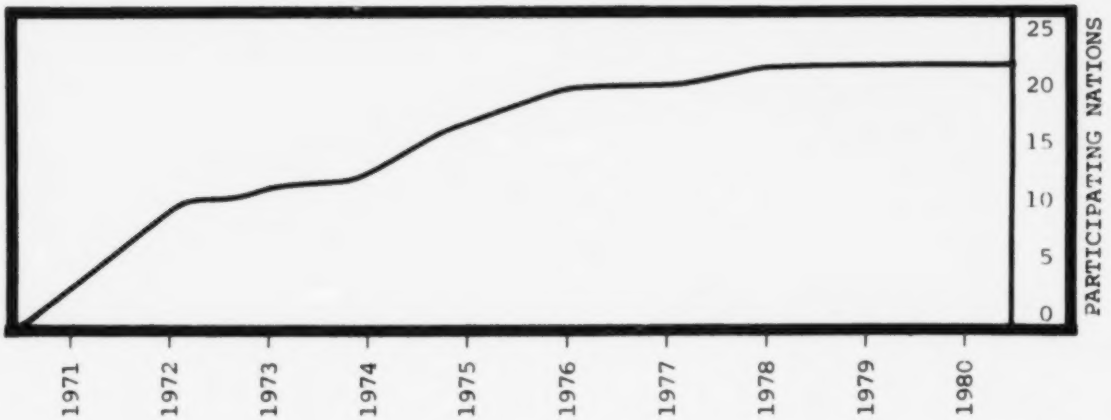

Exhibit 2-B

Number of New Nations Joining EMS Pilot Study Each Year During Past Decade

National Academy of Sciences have sent representatives to meetings of the participants to help in developing work plans and to contribute to information exchange programs.

As the remainder of this report will show, these twenty-one nations and international organizations have worked together to find solutions to complex problems surrounding the delivery of responsive, expedient emergency medical care throughout the world. They have devised mechanisms for exchanging technical knowledge, experience, and data. They have initiated demonstration projects at the national level and have collaborated in EMS system evaluation activities. Finally, they have developed a communications system that assures global dissemination of information on EMS issues.

The last Working Session of the Pilot Study was held at Munich, Germany September 14-16, 1980. Forty delegates from sixteen nations heard reports from leaders of the five project teams; made recommendations for follow-up work on these individual projects; and discussed future international cooperation. Much of this report deals with the results of this meeting.

One of the outcomes of the Munich session that is important to the future of international cooperation in improving emergency medical care was WHO provisional agreement to sponsor the work begun under the Pilot Study. WHO interest in encouraging work in this critical area of health care, as noted earlier, stems from their active interest in accident prevention in member countries. WHO also agreed to give further consideration to holding an inter-regional seminar to discuss sponsorship of the EMS study as well as establishing an advisory committee on EMS to assist in planning the direction of a future sponsorship.

Follow-up action was also a key topic of the Munich meeting. The delegates agreed to hold major meetings in both 1981 and 1982 to discuss the work done with respect to their recommendations. The first of these meetings will be a World Assembly on Emergency Medical Services. It is to be held in Baltimore, Maryland, in November 1981.

CHAPTER
3

HIGHLIGHTS OF PROJECT NO. 1:
1980 SURVEY OF EMS SYSTEMS

Lead Nation: CANADA

Project Directors: Mrs. F. Lorraine Davies, Director, EMS
Department of National Health and Welfare

Mr. David Martin
Telehealth Coordinator and Consultant
in Health Administration
Health Promotion Branch
Department of National Health and Welfare

PROJECT OBJECTIVE:

To collect and disseminate information that may be used to plan, implement, and evaluate advances in EMS systems, and to provide basic information for use by other projects in the CCMS/EMS pilot study

INTRODUCTION

One of the CCMS/EMS Pilot Study's major projects during the past two years was the 1980 Survey of the state-of-the-art of emergency medical services systems in the international community. Led by Mrs. F. Lorraine Davies and Mr. David L. Martin, the survey was conducted via a comprehensive questionnaire mailed to a dozen nations that had actively participated in earlier EMS projects sponsored by the Committee on the Challenges of Modern Society. The methodology used by the project directors and the results of the survey are reported below.

METHODOLOGY

The EMS survey questionnaire was developed by the Pilot Study Executive Committee in January 1979. It was drawn up in both French and English and circulated to twelve countries, whose emergency medical services systems are in various stages of development.

The questionnaire, which is attached as Appendix A of this report, asked for information on both general and specific aspects of the countries' EMS systems, such as the governmental authorities responsible for administering or managing the system, the regional organization, the laws and regulations governing the system, public education and training programs, system components such as communications and transportation, the type of personnel and training requirements, the system's linkage with disaster planning, and any special features of the system.

By the end of October 1980 the following countries had sent in their responses:

Belgium
Canada
France
Greece
Iceland
Italy
Luxembourg
The Netherlands
Portugal
United Kingdom
United States

The responses were reviewed and summarized by the project directors. A draft of the project directors' report was sent to each respondent for review and comment to ensure accuracy.

SURVEY RESULTS

The results of the 1980 EMS Survey have been organized in three parts. Parts 1 and 2 immediately follow. Part 3 is given in the Appendix.

Part 1, "Summary Description of EMS Systems," briefly discusses the evolution and current status of emergency medical services in each of the eleven nations.

Part 2, "Overview of Emergency Medical Services Systems in Eleven Participating Nations," is a set of three summary exhibits which give highlights of various organizational and operational components of the emergency medical services in the eleven countries. The intent of the exhibits is to show, at a glance, the many different approaches being used to formulate and operate emergency medical services systems. Each nation's EMS system is tailored in accordance with its geography, climate, and institutions.

Part 3, entitled "Expanded Responses to Specific Topics on the CCMS/EMS 1980 Survey," gives further particulars of the eleven EMS systems. (See Appendix B.)

PART 1:

SUMMARY DESCRIPTION OF EMS SYSTEMS IN ELEVEN PARTICIPATING NATIONS

SUMMARY DESCRIPTION: BELGIUM'S EMS SYSTEM

Belgium's emergency medical services system has been evolving over the past 14 years. A succession of Public Health Ministers have worked to expand and improve emergency care for accident victims and citizens stricken with sudden illnesses.

Belgium took its first steps in developing emergency health care in 1956 in response to the special needs of polio victims. Prior to the introduction of polio vaccines, almost 1,000 people were stricken with this disease each year. Polio victims who suffered paralysis of the respiratory system found it difficult to locate a hospital capable of giving them proper assistance. Moreover, locating an ambulance with the proper equipment to transport them to the hospital was equally problematic. As a result, the Public Health Minister created an emergency transport organization consisting of approximately fifteen ambulances, dispersed throughout the country and reserved especially for polio cases. The Ministry also provided assistance to seven specialized centers to ensure that appropriate equipment was available to treat polio complications such as respiratory paralysis. These centers were strategically located in major medical facilities.

It soon became apparent that an emergency intervention system of this kind was needed for many other types of illnesses and injuries. On April 8, 1958, therefore, Belgium modified its Public Assistance Law to include a general emergency transportation service.

The new law required the Public Assistance Commissions to supply emergency transportation to every citizen in their territory who needed emergency aid as a result of an accident or serious illness. The Commissions, however, owned no ambulances or hospitals to carry out this legal requirement, and Belgium had no emergency telecommunications network.

The Public Health Minister responded to the problem by creating a special Commission to study the situation. The Commission later made numerous recommendations, many of which strengthened the emergency communications system. For example, it recommended that the system include:

- A nationwide alert system tied to the telephone system
- A unique, central emergency telephone number
- A central point within the territory (dispatch center) to receive all calls and alert the ambulance service, hospital, police, physician, etc.

By October 1959, the Minister was able to inaugurate the first unified emergency number center -- "Rescue Center 900" -- located at Anvers. The 900 number was designated by the Telegraph and Telephone Commission. Within five years, the system was established throughout the country. The last center, at Courtrai, began operating in December 1963.

Despite the progress in emergency communications, during the period 1958 to 1963 the Public Assistance Commissions continued to have great difficulty in meeting their obligations to transport emergency cases to area hospitals.

Finally, in July 1964, a law was passed transferring to the Ministry of Public Health all responsibility for providing transportation and hospitalization to the sick and injured in emergencies occurring on public roads or in public places. The Public Assistance Commissions retained responsibility for supplying aid in other types of emergencies.

The 1964 law took effect in July 1965, when the necessary regulations were issued. The Ministry of Public Health purchased special EMS vehicles and equipment and the Minister promised to establish an emergency and intensive medical services system.

Shortly thereafter, Belgium introduced its first ambulances, specially equipped to transport cardio-respiratory patients under medical supervision. In addition, highly specialized emergency medical centers with up-to-date emergency equipment including hyperbaric chambers were set up.

Prior to 1964 all funding for emergency medical care was supplied by the Public Assistance Commissions. After the 1964 law was passed, a new fund for emergency transportation was created. The fund is supported by the state and insurance companies on a prorated basis. It is intended to guarantee payment of all costs related to medical care (transportation and hospital care) for all illnesses and injuries covered by the law. The fund is limited to emergency medical care unless the responsible physician feels that the patient's condition warrants specialized emergency care. In this event, the fund will cover additional transportation and treatment at a more specialized medical facility.

Since 1964 a number of royal decrees and several ministerial interpretations have been issued concerning EMS services. Most recently, in 1976, a law was passed that gives the Public Assistance Commissions responsibility for responding to all medical emergencies on private property.

SUMMARY DESCRIPTION: CANADA'S EMS SYSTEM

Canada is the second largest country in the world in land mass. It has over 23 million people, most of whom reside within 100 miles of the southern border. Obviously there are serious problems in providing emergency medical services to a relatively small population scattered over such a large geographical area, in a country which has extreme variations in climate. Transporting emergency cases long distances in extreme cold is only one of the challenges with which the country's EMS system must deal.

Under the British North America Act, primary responsibility for the provision of personal health services rests with the provincial governments. Canada is composed of ten provinces and two northern territories -- the Yukon and Northwest Territories. In all provinces and territories, hospitalization and medical services, which include hospital emergency services, are provided under the Provincial Hospital Insurance schemes.

During the past ten years the provinces have gradually begun to provide ambulance services. Currently four provinces provide road-ambulance services. Six provinces subsidize the private ambulance services with provincial funds and these ambulances operate under provincial regulations. The Province of Saskatchewan was the forerunner in providing emergency transportation; it has provided air ambulance service to residents since 1946. Air transport services are now provided by five Provincial/Territorial Governments and one Province had been studying helicopter ambulance service.

All emergency vehicles and support equipment are controlled by provincial regulations or, when these are absent, by guidelines established by the provincial Departments of Health.

Because of its large land mass, long distance communications play a major role in Canada's emergency services. Canada has no nationwide emergency telephone number, largely because the telephone companies are operated on a regional basis. However, the Province of Ontario now has a seven digit emergency number that connects directly with ambulance services. A similar emergency number operates in the greater Winnipeg, Manitoba area as well. A number of other provinces are considering establishing an emergency telephone number.

All vehicles in the emergency services are equipped with two-way radios which connect either a dispatch center or its base, which is generally located at a hospital. Allocation of radio frequencies for emergency purposes is controlled by the federal Department of Communications. Proposals have been made to the Department of Communications asking for greater control over the allocation of radio emergency frequencies. The Department of Communications also has attempted to coordinate the use of radio frequencies with those used by emergency services in various U.S. states which border on Canada.

Canada has no specific policies for designating certain hospitals to receive patients with specific medical problems. In other words, hospital categorization has not yet been universally accepted. However, a number of localities have made agreements regarding the transfer of patients for continuing care once their condition is stabilized.

Emergency departments in the country's larger teaching hospitals are now usually staffed by emergency physicians. Most of these physicians are trained in Canada. Some of the more experienced emergency physicians have applied for American Board Certification. Most emergency physicians are medical personnel who have completed post-graduate work in surgery, internal medicine or family medicine. Some emergency physicians are former general internists. Several universities now offer three-year resident training programs in emergency medicine.

Both the Royal College of Physicians and Surgeons and the College of Family Physicians are beginning to recognize emergency medicine as a separate specialty. It is expected that criteria for preparation, accreditation, and certification in emergency medicine will be established in the near future. The Canadian Association of Emergency Physicians is also actively promoting and lobbying for the recognition of emergency medicine as a specialty.

SUMMARY DESCRIPTION: FRANCE'S EMS SYSTEM

France's system for providing emergency medical services has been evolving for approximately twenty years. In July 1959, as part of plans to assist accident victims, the government announced the organization of a general system of emergency medical services to provide care to those in distress. This federal directive focused on policies for ambulance and hospital services.

Since this initial directive, the government has issued three other major policy directives which have further defined the EMS system. The first, issued in 1965, required certain hospitals to establish mobile units to provide first aid and emergency services. The second, in 1965, formally established the country's Emergency Medical Services (Service d'Aide Medicale d'Urgente, or SAMU). In 1970, the government passed the current law governing health transportation. In addition, in 1978, the Ministry of Posts and Telecommunications established a unified emergency telephone number, which has strengthened access to the emergency medical services.

Since 1970 the government has given hospitals both funds and technical assistance to help them upgrade their facilities and equipment and train EMS personnel. There are now 39 training centers for ambulance attendants and other health care personnel.

France's EMS system consists of a nationwide network of SAMU centers. There are 72 such centers operating today. The SAMU are located in hospitals close to the center of service regions and are directed by physicians of the region.

France's emergency medical services are organized regionally. In some regions, many departments are involved. In every region a specific hospital and a university are designated to provide anesthesia and resuscitation services. The regional concept has contributed to the establishment and development of hospital mobile units as well.

France's EMS system is part of the insured health services of France. The cost of emergency medical services is split between the national insurance health services and the patient. Mutual aid societies and private insurance companies offer plans for health care not covered by public insurance.

The Minister of Health has the prime responsibility for managing national EMS services. The Minister establishes policies, regulations, and management directives. Other ministries are responsible for certain types of services in the EMS system. For example, the Fire-Brigade, which responds to certain types of health emergencies, is under the authority of the Ministry of the Interior; the National Police, which plays an important role in community alerts, is subordinate to the Ministry of Defense; and the Plan Administration Division, under the authority of the Prime Minister, is responsible for ensuring that sufficient funds are available to operate the system.

District prefets are responsible for establishing plans to provide first-aid to accident victims and others in distress within their service areas. In cities and towns where sufficient funds are available, the mayor is responsible for establishing emergency medical services.

France has both public and private hospitals and ambulance services. Approximately 400 hospitals are equipped to receive emergency cases. More than 200 of them have mobile units (ambulances). Public hospitals have a central role in the EMS system as they own medically-equipped ambulances and administer the emergency communications services. These hospitals are autonomous institutions under the auspices of the state. Private hospitals also have a major role in the treatment of emergency cases. Thousands of privately-owned ambulances operate today in France.

The Ministry of Health has the major responsibility for collecting and analyzing EMS data. Maintaining national health statistics is strongly encouraged by the Ministry of Health. This is a complex task because the information system in France is not standardized. The Ministry's Statistics Division and Data Processing Division are required to collect certain national data on emergency medical services. In addition, every SAMU is required to compile its own statistics.

SUMMARY DESCRIPTION:
GREECE'S EMS SYSTEM

Greece has never had a national emergency medical services system. Only recently has the country begun to develop a comprehensive, integrated system.

Until recently all emergency medical cases were -- and in many instances still are -- treated on an ad hoc basis by transporting a patient in need of acute care to a private health clinic, a first aid station, or to a hospital. With the exception of Athens, which has a Central

Ambulance Center, emergency transport is largely by private vehicles, mainly taxis.

Greece's health care system has two main features: (1) government and private insurance systems to fund hospital and medical care, and (2) state-owned and private hospitals or clinics, each having about 50 percent of the country's total bed capacity. The private hospitals tend to be small and dispersed. The only ambulances are government-owned and are stationed at government-owned hospitals.

The existence of two insurance systems and two separate health care delivery systems have impeded the development and growth of a comprehensive, nationally-based EMS system.

In the past few years, some progress has been made in the delivery of emergency health care in the greater Athens area. In May 1977 a state-controlled Emergency Ambulance Center was established to handle emergency calls. The Athens area has one-third of the total population in Greece and 65 percent of its hospital beds.

While the intent of the new ambulance program is to service the greater Athens area, there are not enough ambulance vehicles, equipment, and personnel to accomplish this mission. Moreover, the rest of the country is virtually without any emergency medical services. Some regional hospitals have only one ambulance and that is usually reserved to transport patients to Athens where more specialized services are available.

There are clearly major needs and problems in all areas that normally comprise an EMS system, including the critical fact that none of the hospitals in Greece have an emergency department.

A major project is soon to get underway to analyze EMS needs and suggest action-oriented strategies for designing a system tailored to the country's unique situation.

SUMMARY DESCRIPTION: ICELAND'S EMS SYSTEM

The Minister of Health and the Head Physician of the National Health Service are responsible for managing Iceland's emergency medical services. The National Civil Defense Organization, on the other hand, is responsible for hospital and medical coordination in mass disasters. The Director General of Public Health is required by the National Health Service and the Civil Defense Law to administer those aspects of civil defense involving hospitals, medical treatment and nursing. The Law also requires hospital managers to prepare and implement measures that will enable hospitals to receive and treat the injured and to prepare and operate reserve hospitals.

Iceland's first major emergency services were organized in the capital, Reykjavik, in October 1955. They were moved to a new hospital there in May 1968. Today, Iceland's emergency health care system covers eight regions, one of which is Reykjavik.

All Health and civil defense services are financed by the national budget.

In Reykjavik, the ambulance service is operated by the Fire Department. The ambulance service and police headquarters are equipped with direct telephone lines and have specifically designated radio frequencies. Elsewhere in the country, either hospitals or Red Cross Chapters operate the ambulance services, but radio frequencies are usually shared with other services.

The major needs of the EMS system are: (1) better communications equipment; (2) more qualified first-aid training and ambulance services; (3) improved physical facilities for reception and emergency care, especially in outlying regions; (4) better methods of road transportation during winter; (5) doctors; and (6) funds for air evacuation.

SUMMARY DESCRIPTION: ITALY'S EMS SYSTEM

The Red Cross Society of Italy, in close collaboration with the Ministries of Health and Labor, organized the country's emergency medical services. The Ministry of Health has primary responsibility for administering the EMS system at the national level. Since the system is organized on a regional basis, Regional Health Authorities have the major role in managing the day-to-day operations. Regional Health Authorities develop laws and regulations governing their service areas, and are responsible for the categorization of hospitals and the training and orientation of personnel.

The Ministry of Health allocates funds to each region and, together with the Parliament, coordinates all regional EMS planning. All traditional services are coordinated by national and regional health authorities. Private institutions and organizations, which previously played a key role in the delivery of health care, have been absorbed into the state health system.

All ambulance services are owned and operated by Regional Health Authorities, which establish specifications for the design and equipment of special and life-support vehicles.

Police departments are responsible for emergency communications arrangements and linkages to hospitals and related services. A state agency, with appropriate regional clearance, allocates radio frequencies.

Italy is actively developing information and education programs in accident prevention, water safety, access to the EMS system and first aid. All media (radio, press, and television) disseminate information on these topics. Several Ministries have major roles in these programs. For example, the Ministry of Public Education sponsors accident prevention programs in the schools, particularly in relation to sports activities. The Ministry of Health and the Ministry of Labor sponsor safety and accident prevention programs for business and industry.

Italy has no centralized EMS data collection system. Information is collected at the regional level. The Ministry of Health can request this information for analysis.

A special feature of the system is Italy's Poison Control Center, which now operates in three cities. (See Chapter 7 for more information on poison control activities.)

SUMMARY DESCRIPTION: LUXEMBOURG'S EMS SYSTEM

In the past five years, Luxembourg has made far reaching changes in its general health care services as well as special provisions for emergency treatment.

Since 1976, when the country's master plan for health care was issued, several laws and regulations have organized the health care system. The plan was based on a national inventory of existing health care resources and needs in each of Luxembourg's three service regions. The plan provided for the classification of all health care facilities and defined the procedures and other requirements for each department.

In 1979 the Minister of Health outlined standards for medical care facilities desiring to participate in the EMS system. These standards were formalized with the issuance of a Grand Duchal Regulation dated August 1979, which also required certain hospitals to provide emergency services.

The Ministry of Health, in cooperation with the Luxembourg Medical Association and the Entente des Hospitaux, is organizing the development of emergency medical services at the hospital level. The Minister has reserved a certain number of beds in each region for acute medical cases or disaster situations. Certain clinics and hospitals operate emergency services on a full-time basis. Others take turns handling emergencies on weekdays or weekends. The Medical Association has organized permanent physician services for home medical care on weekends and holidays. The Minister of Health has placed cars, driven by Civil Defense personnel, at the disposal of these physicians.

The government provides a training program for ambulance attendants, but no special EMS training courses are available at the present time for doctors except special training in anesthesiology and resuscitation for EMS specialists. However, the Medical Association and the Institute of Hygiene and Public Health organize special seminars for nurses who wish to specialize in emergency care.

A variety of national organizations offer first-aid training and accident prevention programs for business and industry.

SUMMARY DESCRIPTION: NETHERLAND'S EMS SYSTEM

The Netherlands has a national health system which provides free medical and hospital services for workers earning less than 30,000 guilders a year. Emergency health care, ambulance services, plus transportation to a specialized medical facility (if requested by a physician) are included. The workers' families are also covered. People who earn more than 30,000 guilders must pay for their own health care. Usually they buy private health insurance plans, which pay the state for some or all of the services provided by the national health system. Physicians, hospital, and ambulance services charge higher wage earners for emergency services at a graduated rate established by the government's Tariff Control Board.

The Minister of Public Health and Environmental Hygiene is responsible for the overall operation of the health system. Reporting to him is the State Supervisor of the Public Health Service, who, in turn, appoints inspectors to ensure the adequate operation of all health services, including ambulance services.

The EMS system is regulated by the Ambulance Transport Act of 1971. The main goal of the Act is to improve the treatment of the acutely ill or injured.

The Netherlands is divided into 50 ambulance regions, which serve from 24,000 to over 1,000,000 people. The number of ambulances per person ranges from one per 20,000 to one per 30,000. Each ambulance region has one "central point," or ambulance control center, from which ambulance services are coordinated and deployed.

The Ambulance Transport Act delegates to the Provincial Executive Councils authority and responsibility for (1) administering health care and ambulance services within the regions, including the determination of the number of ambulances, (2) establishing geographic limits for service, and (3) formulating rules for these services. The Provincial Councils may delegate certain responsibilities to municipalities within their service area.

The Ambulance Transport Act also establishes requirements for emergency communications, particularly in regard to the role of the ambulance control stations.

By regulation, hospitals in the Netherlands are divided into three categories. Categorization depends on the number of beds and the type of specialists in the medical facility. There are no hospitals in the Netherlands exclusively for emergencies.

The Netherlands is now developing municipal and hospital disaster plans, including procedures for ambulance services. Emergency plans for airfield and railroad disasters are being prepared.

Future plans for the EMS system include studies of (1) the country's capability to provide medical treatment in wartime; (2) hospital bed potential in peacetime; and (3) methods of emergency casualty evacuation. The Netherlands also plans to establish a nationwide organization of traumatology teams permanently in a state of readiness.

SUMMARY DESCRIPTION: PORTUGAL'S EMS SYSTEM

A new EMS system is rapidly evolving in Portugal. The EMS system is organized on a regional basis with three regions for services -- North, South, and Central. A national ambulance service subsidized by the government was organized in 1975. This year a separate national governing body for the system -- the Cabinet for Emergency Medicine -- was established. The President of the Cabinet is also the Director of the National Ambulance Service. These two organizations share responsibility for organizing and managing the EMS system.

All hospitals in Portugal are state hospitals, funded by the central government. They respond to local and regional needs and interests.

The National Ambulance Service is also funded by the state, which derives revenues for this service through a one percent surcharge on certain classes of insurance (automobile insurance, life insurance, and accident insurance). The ambulances themselves are owned by different state agencies, including police and fire companies. Standards for ambulances and equipment have been developed at the national level.

Portugal has specific campaigns for accident prevention which include programs for the prevention of road accidents. the handling of emergencies at sea, and the prevention of accidents at the work place. First aid programs are operated by the Red Cross. Other EMS prevention programs are aimed at high school students.

In addition to a "115" central emergency telephone system, Portugal has a number of SOS call boxes for responding to emergencies in more sparsely populated rural areas. The SOS calls are relayed to the local police or fire departments.

In addition to making a concerted effort to organize a strong emergency medical system throughout the country, Portugal has begun to develop a civil defense organization.

SUMMARY DESCRIPTION: UNITED KINGDOM'S EMS SYSTEM

In the United Kingdom all emergency medical services are part of the National Health Service, which was organized in 1948 and reorganized in 1974. The reorganized National Health Service empowers the Secretary of State to organize the delivery of health services free of charge to all residents. This includes hospital services, services of medical specialists, and ambulance services.

The major responsibility and authority for planning, organizing, staffing, and day-to-day operations of the emergency medical services rests with Regional Health Authorities. They, in turn, delegate most of the responsibility to Area Health Authorities. In fact, with the exception of ambulance services in London and six other metropolitan areas, emergency medical services are completely organized and administered by Area Health Authorities.

The Department of Health and Social Security coordinates EMS delivery among the regions and provides guidance to the Regional and Area Authorities on matters of policy. The policy guidelines established by the Department are flexible, leaving much room for local interpretation to meet local needs. The guidelines cover ambulance, vehicle and equipment specifications; ambulance service and communications specifications; and ambulance training specifications.

All emergency medical services are paid through general revenues, which are allocated by the Department of Health and Social Security to Regional Health Authorities and, by them, to Area Health Authorities.

The United Kingdom does not have any specific laws and regulations covering emergency medical services. These services come under the general authority of the National Health Services Act.

The organizational structure of emergency medical services in the United Kingdom was impacted profoundly by a report prepared by a subcommittee of the National Health Service in 1962. The report, referred to as the Platt Report, made wide-ranging recommendations for the reorganization of hospitals, ambulance services, and health care personnel. The report made specific recommendations, for example, concerning (1) the rationalization of accident and emergency services; (2) the construction, staffing, and organization of hospital accident and emergency units; (3) the provision of accident and emergency beds within hospitals (30 to 35 per 100,000); (4) the duties of various medical personnel; (5) the designation of specific centers for burn treatment; and (6) the need to educate the public in prevention.

The United Kingdom's EMS system has also benefitted from the recommendations of several other major studies, including the 1976 report of the Expenditure Committee on Accident and Emergency Services, the 1978 report on ambulance training by the National Staff Committee for Ambulance Staff, and the 1979 report, "The Ambulance Service of the Future," by the National Health Service Training and Studies Center in Harrogate.

The United Kingdom is currently working to strengthen the following aspects of its EMS program: (1) further rationalization of hospital accident and emergency services; (2) the development of a more adequate research data base; (3) further studies into the training needs of ambulance attendants, particularly for acute cases; (4) the further definition of the roles of local general practitioners; and, of course, (5) more cost-effective methods for improving services.

SUMMARY DESCRIPTION:
THE UNITED STATES' EMS SYSTEM

A major national effort to improve emergency medical services throughout the nation began with the passage of the Emergency Medical Services Systems (EMSS) Act in 1973. Prior to that time, federal support of emergency medical care was directed to isolated subsystems, to special categories of patients, or to special and unique response activities.

The intent of the EMSS Act is to fund EMS projects at the regional level. To date, 304 EMS areas have been identified. Federal EMS programs funded with federal dollars must use a "systems approach" in planning, coordinating, and implementing EMS systems. The goal of the federal program is to initiate regional planning and integration of the following 15 mandatory components so as to provide the essential and appropriate emergency and critical care services for all emergency patients.

1. Provision of manpower
2. Training of personnel
3. Communications
4. Transportation
5. Facilities
6. Critical care units
7. Use of public safety agencies
8. Consumer participation
9. Accessibility to care
10. Transfer of patients
11. Standard medical record keeping
12. Consumer information and education
13. Independent review and evaluation
14. Disaster linkage
15. Mutual aid agreements

The central theme of the EMSS Act is to develop systems of emergency medical care that will be able to significantly decrease current death and disability rates. While the EMS system must respond to all declared emergency calls within its geographic region, the system must be geared to provide sound, medically competent and comprehensive care to critical patients who must have such a system to survive.

The current problem of these critically ill or injured patients is compounded by the 65 million citizens who enter the EMS system each year, 80 percent of whom cannot be considered "true medical emergencies." Of the remaining 20 percent, 15 percent are real emergencies requiring urgent care (i.e., minor trauma, infectious diseases, and other acute general medical and surgical problems); the other 5 percent are the critically ill and injured. Until a few years ago these critical cases could not be saved. Today, lives can be saved if initial, definitive, and rehabilitative care is given in time and the patient is moved through the regional system and provided essential medical care.

In addition to including the mandatory 15 components, each regional EMS plan must include a description of the general and specific protocols for the emergent and nonemergent patients in its delivery system. It must also include a detailed explanation of triage patterns for critical groups (trauma, burns, acute cardiac, high risk and premature infants, poisonings, psychiatric, drug and alcohol overdose) by identifying the patient treatment needs as well as the involvement of the system's operational components (vehicles, telecommunications, manpower, facilities). These care patterns depend, of course, upon the clinical patient demands, the sophistication of the transportation capability, the level of care during transportation, the communications coordination, the delivery to a categorized general hospital or designated critical care facility, and the migration into the rehabilitation phase. These patient care programs must be established with appropriate back-up relationships by written arrangements among the various provider elements in order to ensure a sound and competent regional EMS system.

The development of regional EMS systems usually starts with an initial upgrading of existing resources and then progresses through periods of increasing sophistication. That is, following the establishment of a basic life support system within the region, there usually is a logical progression to the advanced life support system due to the increasing capabilities of the EMS region.

The federal lead agency for EMSS is the Division of Emergency Medical Services in the U.S. Department of Health and Human Services. The above requirements are spelled out in the Act or in special Program Guidelines, which describe the clinical significance of the systems approach.

In addition to the lead agency, the U.S. Department of Transportation regulates transport during the pre-hospitalization phase. Numerous other federal agencies as well as county, state, regional, and local agencies also set guidelines and develop accident prevention and EMS training programs.

The EMSS Act of 1973, amended in 1976 and 1979, covers federal grant programs that fund the comprehensive regional EMS systems. Incentives to follow federal legal requirements for EMS systems are loans, grants, etc., which are tied to compliance with federal regulations. Federal grant programs for establishing these systems are substantial. For example, grants under the EMSS Act total $182 million for feasibility studies, systems planning, data collection, and establishing new or expanding or improving EMS systems. Moreover, since 1968, the Federal Highway Safety Act, administered by the Department of Transportation, has resulted in $142 million in federal funds. Another $500 to $800 million have been available in non-federal funds.

State and regional lead agencies are responsible for the overall coordination and management of entire regional EMS systems, including cooperation between communities, system operations, and organization of regional resources. The lead agency must have the medical and technical expertise to provide essential technical assistance appropriate to their respective regional EMS systems. Some lead agencies have other regulatory responsibilities (e.g., certification of EMS system personnel, ambulance licensing, etc.) and some have direct operational responsibilities (e.g., ambulance and/or dispatch services).

To improve the assessment of federal EMS grant programs, the Division of Emergency Medical Services recently developed a management information system called REMMIS (Regional Emergency Medical Management Information System). The system will provide well-defined and pertinent information on each of the 304 regional systems. An annual report will be prepared, summarizing the information collected. It will include a review of the components and resources among EMS regions at the planning, basic, and advanced levels of operational implementation; the volume of patients in all critical care groups impacted by the EMS; and reported changes in patient care outcomes.

Until REMMIS was instituted it was difficult to determine how many lives were being saved and the amount that disability was being reduced because of EMS systems.

The current federal thrust to categorize and regionalize hospital trauma critical care services is being carried out by the Committee on Trauma of the American College of Surgeons and the EMS Division of the U.S. Department of Health and Human Services. The federal guidelines are not regulatory in nature; compliance is progressing, however, dut to financial incentives.

The U.S. Department of Transportation has developed training courses for ambulance personnel, dispatchers and first-responders, which are periodically revised. Professional associations provide training and certification criteria; registration for a wide variety of EMS specialties depend on these criteria.

Some of the special features of the EMS systems in the U.S. are: ambulance standards, hospitalization phase technology for specialty and trauma capabilities, communications technology with telemetry and repeater (or relay) linkages, regional poison information control, citizen CPR training, and specialized training for advanced cardiac and trauma care.

For additional information on all aspects of EMS systems in the United States, see Appendix D for a report prepared by Dr. David Boyd, Director of Emergency Medical Services, U.S. Department of Health and Human Services.

PART 2:

OVERVIEW OF EMERGENCY MEDICAL SERVICE SYSTEMS IN ELEVEN PARTICIPATING NATIONS

The following exhibits give brief summaries of the principal organizational and operational components of the emergency medical services systems in the nations that responded to the 1980 survey:

- "Overview of EMS Organization and Information Systems in Eleven Participating Nations"(Exhibit 3-A).
- "Overview of EMS System Design in Eleven Participating Nations" (Exhibit 3-B).
- "Overview of the Disaster Plan and Special Features of EMS Systems in Eleven Participating Nations" (Exhibit 3-C).

OVERVIEW OF EMS ORGANIZATION AND INFORMATION SYSTEMS IN ELEVEN PARTICIPATING NATIONS*

Exhibit 3-A(1)

	EMS AUTHORITY/RESPONSIBILITY	REGIONAL ORGANIZATION
U.S.A.	At the national level EMS authority is mandated by EMS Acts of 1973, 1976 and 1979. Other EMS component authorities include DOT, Department of Defense, etc. At the State level model omnibus legislation is similar to federal EMS Act.	At the national level, pre-hospital EMS services are administered by the Department of Transportation. During the hospitalization phase, they are administered by the Department of Health and Human Services. Other federal agencies set guidelines for EMS systems, too.
U.K.	Although the Department of Health and Social Security develops national EMS policy guidelines, ultimate authority and responsibility for EMS rests with the Secretary of State. The Platt report had great impact on this reorganization.	This country is organized on a regional basis. Area Health Authorities report to Regional Health Authorities. Sizes and populations of each region vary greatly.
PORTUGAL	The Cabinet for Emergency Medicine shares responsibility with the National Ambulance Service for organizing the system. Once the EMS system is in place, the state will govern hospital emergency units and the National Ambulance Service will direct ambulance services.	In Portugal the EMS system is organized on a regional basis. There are three service regions -- North, South and Central.
NETHERLANDS	In the Netherlands, the Minister of Public Health and Environmental Hygiene is responsible for the overall operation of the health care system.	The Netherlands is divided into 50 areas with populations ranging from 24,000 to over 1,000,000. Each area has one central point to coordinate and operate ambulance services.
LUXEMBOURG	The Ministry of Health, in collaboration with the Medical Assocation and the Entente des Hospitaux, is organizing the EMS system.	Luxembourg's health care system is organized or a regional basis. There are three regions -- North, Central (where the capital is located) and South.
ITALY	The Ministry of Health is responsible for national emergency medical services, but all plans are developed at the regional level.	Italy's health and medical care services are organized on a regional basis. Regional Health Authorities develop plans and allocate funds within the region.
ICELAND	Both the Minister of Health and the National Health Head Physician are responsible for managing Iceland's emergency medical services. The National Civil Defense Organization is responsible for medical coordination in mass disasters.	Iceland's emergency health care system is organized into eight regions, one of which encompasses the capital Reykjavik, and another, the International Airfield.
GREECE	The Ministry of Health and Social Security is responsible for emergency medical services at the national level.	EMS services are not organized on a regional basis. Greece recently began operating a program of this type in the greater Athens area with the creation of an Emergency Medical Ambulance Center.
FRANCE	While the Ministry of Health is primarily responsible for the Emergency Medical Aid Services (SAMU), other ministries participate in the management of certain services. Prefets are responsible for establishing first-aid plans.	Regional emergency health care is an important concept in France. In every region, a designated hospital and university provide emergency care services and promote the SAMU concept.
CANADA	Canada's provincial and territorial governments are responsible for administering area hospitals and ambulance services. Air/Sea Rescue (Department of National Defense), the Department of Fisheries, and the Coast Guard provide rescue services.	EMS is divided along provincial and territorial lines with some provinces sub-dividing services by region.
BELGIUM	The Ministry of Public Health and Family is responsible for most aspects of the emergency medical services system. The Public Assistance Commission has responsibility for emergency transportation, and the Ministry of the Interior, for communications.	Belgium organized its EMS system initially at the national level. Several regional EMS programs now have a budget for ambulance driver training.

Exhibit 3-A(2)

*BASED ON RESPONSES TO CCMS/EMS 1980 SURVEY

	LAWS & REGULATIONS	EMS DATA COLLECTION	PUBLIC EDUCATION
U.S.A.	The Highway Safety Act of 1966 covers the prehospitalization phase of EMS services. During the hospitalization phase, the Emergency Medical Services Act of 1973, amended in 1976 and 1978, covers grant programs administered by the Department of Health and Human Services.	The U.S. has developed a national data collection system (REMMIS), which gathers data on 304 regional EMS systems.	Several federal agencies and national organizations provide home safety, occupational safety, first aid and accident prevention programs.
U.K.	EMS comes under the general authority of the National Health Services Act. The Department of Health and Social Security issues specific guidelines for accident and emergency services.	The Regional and Area Health Authorities, in cooperation with the Department of Health and Social Security, are responsible for data collection.	Various national associations and professional societies conduct comprehensive health education and accident prevention programs.
PORTUGAL	Both the National Ambulance Service Public Law and the Ministerial Resolution, which established the Cabinet for Emergency Medicine, govern emergency medical services.	The National Ambulance Service and the Civil Defense Organization, currently being organized, will share data gathering responsibilities.	First aid programs are taught by the Red Cross. Various accident prevention campaigns focus on specific mishaps.
NETHERLANDS	A number of laws govern EMS services including the Social and Health Acts, administered by the National Health Institution, the Ambulance Transport Act and various acts covering mutual agreements for special situations.	Federal, regional, and local health services collect EMS data. A revised form for collecting data is being drafted.	Governmental ministries sponsor prevention programs covering accidents in the home, roadway, industry and school.
LUXEMBOURG	Several recent laws and regulations govern the provision of general health care, emergency medical care, and public safety and security services. Regulations issued in 1979 require hospitals to provide emergency services in the hospital.	The Ministry of Health collects hospital data and Civil Defense (Ministry of the Interior) collects some data on emergency calls.	Several national associations and the Red Cross offer training in first aid, accident prevention and safety in the workplace.
ITALY	Regional authorities develop laws and regulations covering emergency medical services.	Italy has no centralized data collection system. All information is collected at the regional level.	Italy has an active public education program promoted by all the media. Schools and businesses also teach first aid, accident prevention and EMS system access.
ICELAND	The Civil Defense Law requires the Director General of Public Health to administer those aspects of civil defense involving hospitals, medical treatment, and nursing. Hospital managers are responsible for operating hospitals and other services in emergencies.	The Ministry of Health, particularly the National Health Head Physician, collects and compiles EMS data.	Special purpose groups such as the Life-Saving Association, the Fire Department and the Red Cross teach courses on first aid and safety.
GREECE	No specific laws or regulations govern EMS services in Greece except for some regulations covering the Ambulance Center in Athens. The regulations do not cover equipment or operational aspects of the service, however.	No data collection system is currently in existence.	Public education programs are prepared by the Ministries of Health and Labor and the Automobile Association. No programs are given in schools, however.
FRANCE	A 1980 law covers health transportation and the government has issued many statements regarding private ambulance services. An Order in Council in 1965 established France's hospital mobile units.	The Ministry of Health collects and analyzes national EMS data. Every SAMU must compile its own statistics.	The SAMU or the Civilian Securite in the Ministry of the Interior have developed some public education programs.
CANADA	Five provinces have regulations governing the operation of ambulances, the medical equipment in the vehicles and the qualifications of ambulance personnel. The Health Departments of the other provinces have issued specific guidelines for ambulance use.	Statistics Canada collects annual data on hospital emergency units, outpatient visits and emergency unit staffing. Each province and territory collects data.	Many associations, as well as schools and businesses, offer education programs in first aid and accident prevention. Various media publicize EMS information.
BELGIUM	A 1964 law covers all EMS in Belgium. Modified in March of 1972, the law is also affected by a number of provisions of Arretes Royaux, and by several ministerial interpretations.	Ministry of Public Health and Family examines data on emergency calls, ambulance services, and emergency hospital admissions, and coordinates EMS survey projects.	The Road Safety Council prepares accident prevention programs. The Red Cross, nurses, and teachers provide courses in first aid for students and the public.

OVERVIEW OF EMS SYSTEM DESIGN IN ELEVEN PARTICIPATING NATIONS

Exhibit 3-B(1)

	EMERGENCY COMMUNICATIONS	TRANSPORTATION
U.S.A.	Ten Duplex-channels are reserved for EMS systems. Communications Centers, ambulances and hospital emergency rooms have full frequency capability. These centers have public telephone interface and direct lines to various agencies. A "911" number is widely used.	Road ambulances are governed by federal standards that cover the design, size, construction equipment, and exterior ID markings, lights and signs. Vehicles used for mass casualties are not covered. A set of air ambulance guidelines have also been developed.
U.K.	The public can use a universal "999" system in emergency situations. Thirty channels in the VHF high band are for ambulance use. Non-ambulance health services can use four other channels.	National standards exist for vehicle design, identification and equipment. Regional and Area Health authorities can deviate from these standards and have final authority to expend funds for equipment.
PORTUGAL	Portugal has instituted a "115" central emergency telephone number for emergency calls. SOS call boxes in rural area supplement this central telephone system. There are nine radio frequencies for emergency use.	Funding for the national ambulance service is based on a 1% surcharge on certain classes of insurance. The Director of the National Ambulance Service and the Cabinet for Emergency Medicine share responsibility for the service.
NETHERLANDS	The Ambulance Transport Act covers requirements for emergency communications. The Ministry of Traffic runs a "radio control service," which has its own national frequency.	Except for certain national requirements, provinces establish standards for the number of ambulances. Both the Ambulance Transport Act and the Ministry of Transport, Hydraulics and Public Works promulgate regulations for emergency transport vehicles.
LUXEMBOURG	Radio frequencies have been allocated for use by Civil Defense, the Police, the Gendarmarie and for liaison with hospitals. Frequencies are sufficiently broad to permit multiple use. Citizens access the system by telephone or roadside call boxes.	National regulations require ambulance vehicles to comply with certain specifications covering lights, sirens, etc.
ITALY	Police are responsible for emergency communication arrangements and linkages to hospitals and related EMS services. A state agency with appropriate national clearance allocates radio frequencies for emergency use.	All ambulances are owned and operated by Regional Authorities; there are no private ambulances. Specifications for special ambulance units and life support vehicles are established by Regional Health Authorities.
ICELAND	Reykjavik's ambulance service and policy headquarters are equipped with direct telephone lines and have designated radio frequencies. Other localities share their radio frequencies with other services.	Hospitals or Red Cross Chapters operate most of Iceland's ambulance services. The Icelandic Red Cross and the Ministry of Health are developing standards for ambulances.
GREECE	The emergency communications sytem is excellent in Athens, but elsewhere the situation is far from satisfactory. Athens has dedicated radio frequencies which allow physicians stationed at the Emergency Medical Ambulance Center to instruct ambulance personnel.	All ambulances are controlled by the government and most are located in Athens. The government has issued no guidelines for the design or equipment in road ambulances or other rescue vehicles. Ambulances are modified vans, painted yellow or white.
FRANCE	EMAS posts, located in hospitals, function as communications centers for dispatch and deployment of personnel. SAMU are connected by radio to the fire department and the local and national police. Special frequencies reserved for SAMU.	Two principle vehicles differentiated by size, equipment, and function are used for patient transport. Helicopter bases near the coast handle certain rescue situations.
CANADA	All emergency services vehicles have two-way radios. Most provinces assign one to ambulance services, enabling the vehicles to connect with a large dispatch center or smaller hospital based center.	Provincial regulations control emergency vehicles and their equipment. There is a trend toward larger vehicles which enhance access and mobility. One province is experimenting with a dedicated helicopter service.
BELGIUM	Both the Minister of Health and the Minister of the Interior are responsible for Belgium's communications centers. Rescue services have a reserved band of frequencies. All hospitals having a permanent physician to treat emergencies share a special radio frequency.	Ambulance services must comply with certain requirements for the organization of the service, personnel, vehicles and equipment. Currently, 476 ambulances meet these requirements. A National Police helicopter service is available for emergency rescues.

Exhibit 3-B(2)

*BASED ON RESPONSES TO CCMS/EMS 1980 SURVEY

	HOSPITALS	PERSONNEL
U.S.A.	Hospital categorization and specific "specialty center" designations provide the basis for areawide planning and regionalization of emergency and critical care.	Specialty physicians including the new specialty of Emergency Medicine, emergency nurses, EMTs (basic, intermediate and paramedic), first responses, as well as administrators, are all trained and certified by appropriate national training standards.
U.K.	Rationalization (limiting the availability of accident and emergency services) enables hospitals to service a large population group. This practice is feasible only in densely populated areas.	Comprehensive training in treating accident and emergency cases exists for physicians, EMS registrars and specialists, and nurses. Ambulance attendants attend one of twelve special schools.
PORTUGAL	In Portugal, all hospitals are state hospitals which respond to local and regional interests. They are all funded by the central government and certified to receive emergencies.	Ambulance attendants, police, and firefighters must complete basic first-aid courses. No other special training requirements exist.
NETHERLANDS	By regulation,hospitals in the Netherlands are divided into three categories. Categorization depends on the number of beds and the variety of specialists in the medical facility.	The Ambulance Transport Act proscribes proper methods for recruiting and licensing ambulance operators. Nurses receive training in a variety of critical care areas.
LUXEMBOURG	Medical care facilities participating in the EMS system must comply with standards set out in the August 1979 Grand Duchal regulation. The Minister of Health reserves a certain number of beds in each region for acute medical emergencies.	No special training in EMS care is available for nurses or doctors, with the exception of training in anaesthesiology and resuscitation for EMS specialists. Ambulance attendants receive training in treating shock, asphyzia, various injuries, and infection control.
ITALY	In Italy, the Regional Health Authorities designate hospitals according to their treatment capabilities.	The Regional Health Authority is responsible for orienting health care personnel and for all training. In cooperation with university medical schools and schools of nursing, medical students and nurses are trained in emergency medicine.
ICELAND	Hospital managers must prepare and implement measures for receiving and treating the injured. Reykjavik's three hospitals have agreed to take lead responsibility in one of three areas: brain surgery, ophthalmology and burn cases.	Medical students attend Icelandic State University. Icelandic State School of Nursing conducts nursing education.
GREECE	Greece's total hospital bed capacity is equally split between government-owned units and private units (clinics). Private clinics tend to be small and dispersed. Ambulances are dispatched to receiving hospitals based on the specialities of the medical staff.	No speciality courses or certifications are required for EMS personnel. Nurses and ambulance attendants are required to have general nursing or first aid qualifications, respectively.
FRANCE	Hospitals are classified in four categories: the community hospital, the general hospital, the specialized hospital and the regional hospital. This system enables the Ministry of Health to compose a list of health facilities capable of receiving emergencies.	Health care personnel attend special training courses offered by universities. Ambulance attendants and other personnel enroll at one of 39 special emergency training centers located near the SAMU.
CANADA	A federal/provincial group is developing guidelines for pre-hospital emergency care and hospital emergency units. A number of localities have entered into cooperative agreements regarding the transfer of stabilized patients for continuing care.	Most provinces require standard first air training or EMT preparatory courses for ambulance personnel. For physicians, the recognition of emergency medicine as a specialty is growing.
BELGIUM	To be eligible to provide emergency services hospitals must supply such basic services as resuscitation, blood transfusion, oxygen therapy, x-ray, and laboratory work. Physicians in the Department of Surgery control hospital emergency services sections.	Ambulance personnel are required to take a a [illegible]-hour course, which covers rescue, resuscitation and first-aid for accident victims. Refresher courses must be taken every 5 years. Nurses and physicians attend specialized courses.

OVERVIEW OF DISASTER PLAN & SPECIAL FEATURES OF EMS SYSTEMS IN ELEVEN PARTICIPATING NATIONS

*BASED ON RESPONSES TO
CCMS/EMS 1980 SURVEY

	DISASTER PLAN	SPECIAL FEATURES
U.S.A.	Disaster planning is one of 14 mandatory components of the national EMS program. It requires both linkages with other disaster preparedness groups and annual disaster drills.	Regional poison information and control, citizen CPR training of 25 million Americans and special training for advanced cardiac and trauma care.
U.K.	Regional Health authorities coordinate plans among service areas and maintain lists of hospitals to receive casualties. Planning for major disasters is voluntary.	A centralized poison information service is located in London. In some areas general practitioners are organizing teams to provide on-location care for road accident victims.
PORTUGAL	Portugal is beginning to organize a National Civil Defense System. No guidelines or policies exist for institutional or community disaster planning.	Both the National Ambulance Service and the Cabinet for Emergency Medicine can sponsor EMS research.
NETHERLANDS	The Netherlands is preparing municipal and hospital disaster plans. Specialized plans for airfield and railroad disasters, now being developed, include the formation of traumatology teams.	The Netherlands is now developing municipal and hospital disaster plans as well as specific plans for air and rail disasters. Plans include the formation of traumatology teams.
LUXEMBOURG	Luxembourg hospitals have no formal plans for receiving victims in the event of a major disaster.	Luxembourg is working with the European Community on Reciprocal Health Assistance on plans for dealing with disasters, major accidents and exceptionally grave illnesses.
ITALY	Italy's Ministry of Health has developed guidelines for mass casualty situations. Both the National and Regional Health Authorities and the Army have developed disaster plans for air, rail and highway disasters.	In Italy, a model Poison Control Center now operates in three cities. The use of mobile hyperboric chambers for rescuing divers is presently under study.
ICELAND	National Civil Defense, which oversees community civil defense planning, coordinates disaster plans. The Medical Service shares responsibility for disaster response with National Civil Defense.	Scout rescue teams assist the medical services in emergency and disaster situations, rendering first aid and assistance at hospitals.
GREECE	Greece has no disaster plan.	A project is currently underway to design an EMS system, but currently emergencies are handled on an ad hoc basis. No hospital has a designated emergency or casualty unit: cases transported to a private clinic, first aid station or hospital.
FRANCE	A disaster activates the implementation of five services including Police and Liaison, Rescue and First Aid, Mutual Aid and Medical Care, Transport and Works Services, and Coordination under the authority of the prefects.	SAMU is a part of France's insured health services. Hospitals play a central role in the emergency medical services by providing medically equipped ambulances and administering the SAMU.
CANADA	Overall coordination of federal disaster plans is by Emergency Planning Canada. All provinces encourage community disaster planning, including health response plans. Emergency Services and Hospital Accreditation Association also provide plan guidelines.	For advice and response, directories list telephone numbers for Poison Control Centers. A similar mechanism exists to handle serious chemical spills. Canada is experimenting with emergency long distance transmission of X-rays by satellites.
BELGIUM	Both the Minister of Health and the Minister of Interior coordinate disaster rescue operations. Civil Defense prepares general and special plans ranging from plans for war to those covering train and air disasters.	Belgium has established a mutual aid agreement with France's EMS system (SAMU). Courses on poison control for nurses and physicians are provided.

CHAPTER

4

HIGHLIGHTS OF PROJECT NO. 2

ORGANIZATION AND MANAGEMENT OF EMS SYSTEMS

Lead Nation: USA

Project Directors: Dr. David Boyd, Director of Division of EMS
Bureau of Medical Services, Health Services
Administration, Department of Health and
Human Services

Dr. John Otten, Technical Advisor to DHHS,
Region V, for EMS

PROJECT OBJECTIVES:

- To establish criteria for organizing and managing national and international EMS programs
- To establish a methodology for evaluating the effectiveness/efficiency of these systems

INTRODUCTION

This project formulated guidelines for organizing and managing a national EMS program. More specifically, the U.S.-led project developed guidelines for (1) system organization, (2) system design, (3) linkages with other systems, and (4) data collection and system evaluation. These guidelines were drawn from a study of emergency medical legislation, system design strategies, and management and operational techniques used in many countries that participated in the Pilot Study.

The EMS Organization and Management Project was headed by Dr. David Boyd, who was assisted by a noted U.S. medical consultant, Dr. John Otten, and numerous international EMS experts.

The remainder of this chapter will discuss the project methodology, suggested guidelines for organizing and managing a "model" EMS system and the recommendations for follow-up work made by the Pilot Study at its working meeting in Munich, September 14-16, 1980.

METHODOLOGY

To achieve the above two project objectives, Dr. Boyd and his colleagues built on the work of the two earlier EMS projects led by Italy and

Portugal, which culminated in an evaluation methodology for emergency medical care systems. The framework of that evaluation methodology, outlined in CCMS Report Number 22, "Emergency Medical Services Project," enables local administrators and health officials to identify, quantify and evaluate the impact of an EMS system. The methodology, moreover, allows a nation to determine the effectiveness and capability of its existing EMS services and to estimate the cost of any proposed changes.

In addition to this earlier research, the project team reviewed national and regional programs in the participating nations, focusing on data collection methods, evaluation techniques, implementing legislation, the availability and organization of EMS services such as health care facilities, communications and transportation support systems, personnel and training requirements, outreach programs, disaster linkages and the types of medical care provided. The project team also collected sample legislation and reviewed standards and methods for designating and classifying hospitals and other EMS system components.

SUGGESTED GUIDELINES FOR A MODEL EMS SYSTEM

Most EMS networks in the world, whether national or regional, are disjointed and limited in scope. They usually place emphasis on a few components rather than treating them as an integrated coordinated system. Clearly, the overall goal of an EMS program should be to reduce avoidable death and disability from accidents or sudden illness by providing timely, appropriate medical services.

There is a growing recognition by developing nations throughout the world, particularly the member nations of NATO and WHO, that accidental death and disability can be prevented by an appropriately designed, responsive patient-oriented system.

The following guidelines for developing or improving an EMS system in any nation are broken down into four parts:

1. System Organization
2. System Design
3. Communication Between Regional Emergency Systems
4. Data Collection and System Evaluation.

- System Organization

  - National Level

    At the national level an initiative must be undertaken to prevent accidental death and disability. This requires a commitment by the Chief of State to provide timely, appropriate medical care for emergency incidents. The Government's Ministry of Health must assume the role of "lead agency" and establish through legislative authority a division to oversee the provision of emergency medical services. A knowledgeable person should be appointed as director of this division. It is important that broad EMS policies and goals be established at the national level. (Legislative authority of this type has been established in Portugal, the Netherlands, Iceland, the United Kingdom, Canada and France, among others.)

- Regional Level

  Experience has demonstrated that a nationwide organization of EMS services may not be workable in many countries, large or small. A nationwide network organized into small, regional units or service areas is generally a more feasible approach. (France, Iceland, the Netherlands and the United Kingdom use a service area approach, as, to some extent, do Canada and the U.S.).

  First, regional or service area boundaries should be defined. Then an EMS council for each region should be established. The council should consist of representatives of all groups that will be involved in the system--physicians, nurses, emergency medical hospital administrators, law enforcement officials, fire chiefs, and other health care providers and consumer organizations.

  A medical director and an administrator for the service region should be appointed. These two EMS officials must work in close cooperation as all aspects of a well-functioning system require both medical expertise and management capability.

- System Design

  In drawing up the design of the EMS system at the regional (or area) level, many factors must be taken into account such as population density, geographic variance, existing transportation facilities, and the economics of the region. In addition, the specific needs for emergency care must be defined, based on the number and types of accidents and emergency illnesses (coronary occlusions, burns, poisonings, spinal cord injuries, behavioral emergencies, etc.) that have occurred in the region in the past.

  The design of the system should cover (1) categorization of emergency facilities ("horizontal categorization"), (2) designation of critical care areas ("vertical categorization"), (3) treatment services protocols, (4) transfer protocols, and requirements for (5) personnel, (6) communications, and (7) transportation.

  - Categorization of Emergency Facilities

    A perfectly designed and implemented EMS system would arrange those fixed and mobile emergency facilities, personnel and technical adaptations necessary to best deliver patient care to all individuals in the service area--at the scene, during transport, and by triage--to categorized facilities that are capable of providing medical services appropriate to the conditions of the patient and consistent with professionally acceptable standards of care.

In designing the system, primary consideration should be given to categorizing the facilities. A method used effectively in some regions of the U.S. involves both "horizontal" and "vertical" categorization.

Horizontal categorization, the first step, selects hospitals on the basis of their acute care capabilities. This method of categorization was outlined in the "Bulletin of the American College of Surgeons" in August 1979. Three levels of response were defined: Level I medical care facilities are those capable of providing maximum care; Level II facilities provide intermediate care; and Level III facilities are capable of minimal care. (A categorization method of this type has been used effectively in Illinois' regional health care system for nine years.)

- Designation of Critical Care Areas

Once all facilities in the region have been categorized, a vertical categorization should be effected. This involves designating these facilities according to the types of critical care services they can deliver. Critical care services might include special personnel and facilities to handle trauma, burns, cardiac arrest, spinal cord injuries, behavioral problems, poisonings, or neonatal care.

Experience in mature EMS systems in the United States indicates that approximately 85 percent of all critically ill or injured patients can be adequately treated at the institution to which they are first taken. Only 15 percent must be transferred to a facility having higher treatment capabilities. Of this 15 percent only 5 percent, in the case of trauma, must be transferred to a Level I facility. The function of a Level III facility receiving a trauma case is, of course, to resuscitate, stabilize, and prepare the patient for a safe and efficient transfer to a Level II or Level I facility where more sophisticated treatment services are available.

- Treatment Services Protocols

The Medical Director of the region should develop basic treatment services protocols with the advice and assistance of area physicians. The development of these protocols is essential to ensure (1) that the EMS services provided by each component of the system are appropriate to the medical conditions of the patient and (2) that the services are consistent with professionally accepted standards of care.

- Transfer Protocols

The region (service area) should develop transfer protocols to ensure appropriate utilization of all EMS facilities. These agreements may be very detailed or very simple. For example, a region may institute detailed protocols for transferring patients to a higher care facility when the facility that initially received them cannot provide adequate treatment. On the other hand, the agreements may simply state that a Level I hospital will accept any patient needing special emergency care if referred by a physician in the regional system.

- Personnel and Other Resource Requirements

Based on the regional data collected to determine the needs of the EMS, personnel and other resource requirements can be determined. The system will include the following personnel, all of whom will probably require special training of some sort:

- First responders: These are ordinary citizens who have the initial contact with the health care emergency. Programs such as citizens CPR or first-aid courses sponsored by the Red Cross or the Heart Association can provide an adequate number of trained first responders.

- Law enforcement agencies and fire-brigades: They should also be trained to the level of second responders or Emergency Medical Technicians (EMT).

- Other personnel: These include paramedics, emergency room nurses, and emergency room physicians. Special courses in emergency medicine should be designed and implemented for each of these groups.

Resources other than personnel should also be determined. For example, the number of coronary care beds, intensive care beds, dedicated operating room suites, as well as rehabilitation requirements in each facility should be geared to the needs of the system.

- Communications Requirements

An EMS communications system should be designed to permit "on-line" medical control of all operations in the field on a 24-hour basis. Control will be achieved primarily by radio, but remote telephone switching systems or dedicated telephone lines connected to short-range radio frequencies may be used for some parts of the service area.

Central dispatch of all emergency vehicles in the region should be effected so that EMS resources are deployed promptly when needed throughout the service area.

The communications network should also permit easy access to the system by all citizens. Preferably this will involve instituting a central emergency telephone number such as "911," which is easy to remember and can be quickly dialed by a concerned individual in an emergency.

- Transportation Requirements

Patient transport capabilities also should be determined. Four types of vehicles are typically used to transport emergency cases:

1. Conventional ambulances: These must have a patient compartment of sufficient height, width and length to permit easy patient access and the performance of life-saving procedures during transport.

2. Over-land critical care vans: These are large ambulances which are not used as primary vehicles. They are mobile intensive care units used to transport patients from the hospital of first admission to a facility having higher care capabilities. The vehicles are staffed by whatever personnel are appropriate to the medical conditions of the patient. For example, a trauma patient would be attended in transit by a nurse and physician capable of caring for a patient with multiple injuries. A coronary patient on the other hand, would be transferred by a nurse trained in coronary care and a cardiologist, etc.

3. Rotary-wing aircraft (helicopters): This type of aircraft has become increasingly essential for emergency medical aid services. It allows relatively fast point-to-point transport of critically ill and injured individuals, e.g., directly from the accident scene to the trauma center. It is effective for transporting patients distances up to 150 miles.

4. Fixed-wing aircraft: These are twin engine aircraft designed to transport emergency cases long distances (over 150 miles). A disadvantage of this type of vehicle is that the patient must be transported to and from an airport in an ambulance. This obviously necessitates moving the patient several times before arrival at the treatment center.

- Communication Between Regional Emergency Systems

Regional (or service area) EMS officials must also establish effective linkages with other EMS systems so that a concerted response can be made in the event of disasters or major medical emergencies. Linkages would include (1) mutual aid agreements with surrounding service areas or (2) collaborating with national health care authorities to draw up disaster plans for integrating all public services to deal with medical emergencies in the aftermath of a natural or man-made hazard. These are briefly discussed below.

- Mutual Aid Agreements

  Mutual aid agreements between adjacent regions often permit more timely, appropriate responses to many types of medical emergencies that require capabilities beyond the resources of a single region. Neighboring EMS systems should develop agreements to share emergency transport, communications, special services at medical facilities, etc. when major emergencies occur or when accidents or acute medical situations require a response in outlying areas or across regional boundaries.

- Disaster Linkage

  Regional EMS systems should develop plans to provide an appropriate medical response to the victims of natural or man-made disasters such as floods, earthquakes, airplane crashes and chemical spills. These plans must be coordinated with all public and private agencies in the service area. Local disaster plans should also be closely coordinated with national disaster plans.

- Data Collection and System Evaluation

  A key element of building an effective EMS system at the local or national level is a system for collecting, processing and analyzing data on the day-to-day performance of all components of the emergency care system. An effective data collection system can improve planning, programming, budgeting and other key management functions as well as show where modifications in various system components can result in a more timely, coordinated medical response.

  EMS data collection is a fundamental ingredient of adequate system evaluation at all times. For additional information, see Chapter I of this report, which describes in more detail the evaluation methodology developed under the CCMS Road Safety Pilot Study and complete report of the work done by the two early EMS projects, discussed in CCMS Report Number 22.

EMS PILOT STUDY RECOMMENDATIONS

The following specific recommendations for improving the organization and management of emergency medical services at the regional, national or international level, as indicated, were endorsed by the delegates of the sixteen nations who attended the September 14-16, 1980 meeting of the EMS Pilot Study in Munich, Germany.

RECOMMENDATIONS (Continued)

1. Legislation should be passed at the national level to establish and implement the EMS program.

2. To enhance operational responsiveness and provide data for evaluating the system, a national EMS data collection system should be instituted.

3. Appropriate governmental authorities in each EMS service region (or service area) should determine the capability of each hospital within the region to handle specific types of emergencies, and give direction on all aspects of regional EMS operations.

4. A system for categorizing patients based on the nature and severity of their injuries should be developed. This will ensure that each patient in need of emergency care is transported to the hospital capable of providing the treatment that is most appropriate for the medical condition of the patient.

5. A government agency, council or institute representing all aspects of EMS delivery should be established at the national level to ensure that:

   - Direct services are properly planned, delivered, and evaluated in each region (or each service area).

   - Government appropriations and funding authorities are properly advised of the performance and effectiveness of the system.

CHAPTER
5

HIGHLIGHTS OF PROJECT NO. 3:
COMMUNICATIONS, FIRST RESPONSE AND TRANSPORTATION

Lead Nation: FRANCE

Project Directors: Professor Maurice Cara, Chief Medical Officer
Necker Hospital, Paris, France

Mr. Rene Coirier, Ministry of Health

PROJECT OBJECTIVE:

- To study, assess, and recommend minimum international standards for the transportation and communication components of EMS systems

INTRODUCTION

The EMS Communications, First Response and Transportation Project formulated definitive guidelines for several key components of a nation's emergency medical services system as well as general suggestions for a more timely medical response.

The project was co-directed by Professor Maurice Cara and Mr. Rene Coirier. International experts in the field of communications and transportation assisted in the development of the guidelines for an EMS (1) communications system; (2) transportation system; and (3) life and environmental support equipment, which are discussed below.

During the follow-up period, the project staff will build on these guidelines and frame minimum national and international standards for the transportation and communications components of an EMS system, in accordance with the objective stated above.

At the conclusion of this chapter, the recommendations of the CCMS/EMS Pilot Study's Working Meeting, held in Munich in September of 1980, will also be reported.

SUGGESTED GUIDELINES FOR DESIGNING THE COMMUNICATIONS AND TRANSPORTATION COMPONENTS OF AN EMS SYSTEM

The project staff developed the following general guidelines for designing EMS communications, life support and transportation systems that will help to achieve a timely, effective medical response:

- Coordination of pre-hospital and hospital treatment is essential and must be developed in a way that medical control is maintained throughout.

- Communications, life support systems, and transportation systems must be designed in a way that efficient, modern techniques for sustaining life are available until definitive treatment can be performed by competent medical personnel in more ideal conditions.

- An effective EMS system is only possible where an efficient communication system is available to receive alarm calls.

With respect to the communications system, the suggested guidelines were:

- To be effective, a communications system must permit easy access. A 24-hour emergency telephone number, for example, is essential in populated areas.

- Communications must be maintained throughout the intervention. The communications network should ideally include radio and telephone, both integrated tnrough a central command and control point. Telephone service is necessary to link fixed points, such as the location where the need for medical help first develops (the scene of a road accident) or a hospital which will receive the victim. Radio service is required to establish and maintain contact with mobile EMS units (ambulances and other rescue vehicles) and, in some countries, to contact doctors and hospitals. Radio frequencies exclusively for the use of the EMS system should be established.

- The communications system must be tailored to the unique environment and institutions of the country. For example, the design of the system will depend greatly on the geography, the climate, and the type of institutions that will be incorporated in the system.

- Information about the capabilities of various hospitals to treat specific kinds of medical emergencies is indispensable.

- The communications system must maintain appropriate interface and coordination with the person seeking aid, the EMS team, the receiving hospital, security services (police, firemen, etc.) and with central information systems such as poison control centers.

With respect to transportation, the following was suggested:

- Standardization of EMS vehicle equipment and first-aid techniques is essential. Appropriate techniques for each type of response should be adopted.

- Various types of vehicles should be considered -- light ambulances (for transporting patients who do not require care enroute); ambulances that can monitor the patient's condition and permit minimal emergency treatment such as cardiac massage, artificial respiration, etc.; ambulances that have sophisticated equipment that will enable doctors to treat patients enroute to the hospital; as well as rotary and fixed-wing aircraft, railroad cars, and ships.

In certain situations, helicopters are indispensable, especially where roads are poor or where the victim requires immediate care at a facility located at some distance. Fixed-wing aircraft should also be considered, provided that landing and take-off conditions can be met. Both types of aircraft, like ambulances, should be medically equipped and have treatment staff.

Railroads are useful in some situations, especially where large numbers of victims must be transported. Ships can also be used in certain situations; often they can be assisted by helicopters.

With respect to life and environmental support equipment, the following guidelines were suggested:

- EMS personnel should have uniforms that permit easy identification. This is especially important for medical personnel. The working conditions and the climate in which EMS personnel will perform their duties should also be taken into account in designing proper dress.

- Patients will require thermal and moisture protection, as well as protection to prevent further injury. The EMS system should also be capable of assuring certain minimum physiological needs of patients, such as means of monitoring and maintaining proper blood circulation, heart functions, proper respiration, etc.

The project staff also made several recommendations about other aspects of the system such as proper training for all EMS personnel, a system for collecting basic data about EMS operations and evaluating the system, and the standardization of first-aid procedures and equipment.

In addition, the staff recommended that in the event of disasters, the EMS should be integrated into the total lifesaving effort being conducted by civil authorities. EMS personnel should be aware of the types of hazards (earthquakes, hurricanes, radiological contamination, etc.) to which the community might be exposed and be trained to deal with emergencies associated with such hazards.

EMS PILOT STUDY RECOMMENDATIONS

The following specific recommendations for improving communications, first response and transportation aspects of the EMS system at the regional, national, or international level, as indicated, were endorsed by the delegates of sixteen nations who attend the September 14 to 16, 1980 meeting of the EMS Pilot Study in Munich, Germany.

1. National and international standards should be developed for EMS transportation, first response, and communications equipment.

2. In several countries, rotary and/or fixed-wing emergency transportation has proven effective in certain circumstances. It is therefore recommended that governments study the feasibility of using aircraft for emergency transport.

3. Rotary and fixed-wing EMS operations should be coordinated and directed by a government health authority. Separate standards should be established for flight personnel, medical personnel, and equipment in the aircraft.

4. An EMS communication system (telephone and radio) should be developed, at the appropriate level, to provide direct communication with responsible medical authorities. This will ensure coordination of pre-hospital and hospital treatment and maintain medical control of EMS operations throughout the intervention.

CHAPTER
6

HIGHLIGHTS OF PROJECT NO. 4:
EMS TRAINING AND PUBLIC EDUCATION

Lead Nations: ITALY and PORTUGAL

Project Directors: Professor Corrado Manni, Director, Reanimation Center
Instituto di Anestesiologia e Rianimazione

Dr. Eduardo do Amaral, Director, Service de Medicina
Operatoria, Faculty of Medicine
Universidade de Lisboa

PROJECT OBJECTIVES:

- To develop a multinational training program plan for EMS personnel
- To develop a public information and education program

INTRODUCTION

During the past two years, the EMS Training and Education Project has made great progress in developing, testing, and promoting national programs to educate the general public and train all those involved in the delivery of emergency health care. The project has also engendered wide support and interest from public officials, the media and international experts in emergency health care. Project participants are still actively engaged in follow-up activities.

The co-directors of the project are Professor Corrado Manni of Italy and Professor Eduardo do Amaral of Portugal. These noted international health care experts assembled a distinguished international team to assist them, including Dr. Knud Jessen, Director of Aeromedical Services in the Danish Defense Command; Professor Sergio Magalini of Italy, who also chairs the CCMS/EMS Poison Control Project; Dr. Francisco Rocha da Silva, President of Portugal's Cabinet of Emergency Medicine; Professor Maurice Cara of France, who serves as Co-Chairman of the CCMS/EMS Communications, First Response, and Transportation Project; Professor Louis Serre, Director of SAMU, Montpellier, France; Dr. Morgan Fahey of New Zealand; and Dr. William R. Gemma, Chairman of the CCMS/EMS Pilot Study.

The remainder of this chapter discusses: (1) the methodology used by the project team to achieve the objectives stated above; (2) the project's major conclusions; (3) the progress made in implementing EMS education and training programs at the national level (in Italy and Portugal, the lead nations); (4) the progress in gaining the interest and support of the international community; and (5) the recommendations for follow-up actions made by the CCMS/EMS Pilot Study at its Working Meeting in Munich, Germany, in September 1980.

METHODOLOGY

To achieve the project objectives, the co-directors developed a survey questionnaire, which was later approved by the other members of the team and circulated to participating nations. The questionnaire asked each country to submit certain information on pre-system and system activities currently in progress to train EMS personnel and educate the public on how to provide timely emergency action.

Pre-systematic activities include those activities necessary to bring about a timely appropriate response by the general public before the system is accessed. Systematic activities include those activities necessary to train EMS system personnel, beginning with appropriate pre-hospital response and continuing through preparatory training for EMS specialists.

Based on the survey results and discussions among team members, a framework for a national EMS public education and training program was developed.

This framework included the following education and training activities:

- PRE-SYSTEMATIC ACTION
  - Public Education Programs
    - Television
    - Radio
    - Cinema
    - Press
  - Elementary School Programs

    Training of specialized personnel to teach children the importance of the EMS system as well as basic procedures of emergency care
  - Industrial Education Programs

    Training of monitors to alert workers to the importance of the EMS system and give them emergency care instruction
- SYSTEMATIC ACTION
  - Special courses for the following support personnel:
    - Ambulance drivers
    - Pilots of rescue helicopters and ships

    - Class 1 Emergency Medical Technicians
    - Class 2 Emergency Medical Technicians
    - Class 3 Emergency Medical Technicians
    - CPR technicians
    - Poison control personnel
    - Obstetrics personnel
    - Life guards
    - Scuba teams
    - Communications personnel
    - Central dispatchers

- EMS courses for emergency room and ICU nurses

- Special EMS programs for medical students covering the following:

    - Explanation of EMS Systems
    - Resuscitation
    - Traumatology
        - Head and face
        - Thorax
        - Abdomen
    - Drowning
    - Obstetrics
    - Pediatrics
    - Cardio-Vascular
    - Poison Control
    - Disaster Training

- Special post-graduate programs for acute medical situations, such as:

    - Anesthesiology and Resuscitation
    - Traumatology
        - Neurosurgery
        - Chest surgery
        - Abdominal surgery
        - Orthopedics
    - Drowning
    - Cardiology
    - Pediatrics
    - Obstetrics
    - Psychiatry
    - Disaster Medical Screening
    - Burns
    - Poison Control

PROJECT CONCLUSIONS

Based on its research over the past two years, the project team concluded the following:

- Public education and training should be an integral part of a country's EMS system.
- EMS training and education programs should include both pre-systematic and systematic actions directed to the groups listed in the framework outlined in the previous section. The following are illustrations of programs applicable to a pre-systematic education program:
    - Education of the general public on the importance of an effective EMS system
    - Public education on the use of a universal number for emergencies, the use of SOS call boxes, and training in simple life-saving procedures
    - Utilization of mass media
    - Legislative actions to establish basic-level EMS programs in the curricula of elementary schools, driver's education programs, and industry
    - Extrication courses for police and fire personnel
- These programs, moreover, should be drawn up in such a way that laymen, public assistance personnel (police, fire, and rescue) as well as health care professionals and paraprofessionals can render assistance appropriate to their roles in the system.
- Training should be required for EMS system personnel at all levels. Refresher courses in the latest emergency techniques should also be mandatory.

ACCOMPLISHMENTS AT THE NATIONAL LEVEL

The project team's accomplishments at the national level in Italy and Portugal concentrated primarily on making public officials, the media, and ordinary citizens aware of the critical role the general public can play in medical emergencies.

In Italy, the media agreed to participate in the development of a national effort to inform the public concerning: simple first-aid measures; what each individual -- the victim as well as the person supplying the assistance -- should do in specific emergencies; and ways of accessing existing emergency medical services. The media also agreed to report instances in which the timely intervention of emergency techniques prevented or mitigated death or disability (e.g., a son who saved his father's life by giving heart massage or a person saving a friend by giving artificial respiration). The project team has developed a series of short public service programs on accident prevention and first-aid techniques. Television and radio stations occasionally insert these public service spots during news programs. To gain the interest and support of public authorities to improve emergency medical services in Italy generally, the Italian Society of Intensive Therapy will focus on education, training, and planning for medical emergencies outside the hospital.

With respect to national programs in Portugal, where a total reorganization of emergency medical care is now underway, this country, too, has successfully developed several public education programs. Examples include a set of matchboxes that illustrate various first-aid techniques and film clips that appear on national television.

ACCOMPLISHMENTS AT THE INTERNATIONAL LEVEL

In addition to the broad support from public officials, health care experts and the media in Italy and Portugal, the project team succeeded in eliciting wide interest from the international medical community.

Two examples of the international interest the project has engendered are:

- A cooperative EMS training program between Egypt and the United States is currently underway.
- Members of the Committee were invited to present programs at various meetings concerned with topics relevant to EMS.

In support of the work done by the project team, the CCMS/EMS Pilot Study endorsed the conclusions of the EMS Training and Public Education Project in their recommendations for follow-up action by the team.

EMS PILOT STUDY RECOMMENDATIONS

The following specific recommendations for improving EMS training and public education programs at the regional, national, or international level were endorsed by the delegates of the sixteen nations who attended the September 14-16, 1980 meeting of the EMS Pilot Study in Munich, Germany.

1. EMS training and public education programs should be an integral part of the EMS system.
2. Training programs should be such that laymen, public officials (police and fire), and emergency medical personnel in all capacities are able to render assistance appropriate to their roles in the system.

3. Education for the general public should include, at a minimum, information on (a) first-aid, (b) simple life-saving techniques, (c) accident prevention, and (d) how to access the EMS system. An all-media approach should be used to disseminate this information. Children of all ages should receive EMS education in school.

4. EMS professional and support personnel in all capacities (ambulance drivers, rescue pilots, nurses, medical students, physicians) should not only receive initial training in all aspects of emergency health care, but must be given refresher courses to keep them up-to-date on recent advances in emergency care.

5. National standards for training EMS personnel should be developed. The standards then should be evaluated as a basis for determining a set of minimum international EMS training standards. Mechanisms should be developed for disseminating and implementing these minimum standards worldwide.

CHAPTER

7

HIGHLIGHTS OF PROJECT NO. 5:
POISON CONTROL

Lead Nation: ITALY

Project Director: Professor Sergio Magalini
Director, Antivenom Center
Instituto di Anestesiologia e Rianimazione

PROJECT OBJECTIVE:

- To study, assess and recommend minimum international standards for acute poisoning prevention and intervention

INTRODUCTION

The last of the five special projects of the EMS Pilot Study examined poison control systems in participating nations. Its purpose was to develop a model poison control system that could be replicated by developed and developing nations throughout the world. Another intent of the study was to develop minimum international standards for preventing and treating poisoning incidents.

Italy was the lead nation of this project, headed by Professor Sergio Magalini.

This chapter discusses (1) the project methodology; (2) its accomplishments at the national level; (3) progress made at the international level; and (4) the Pilot Study's recommendations for future action in the study area.

METHODOLOGY

The methodology for the project was established in January 1979 by the Pilot Study Executive Committee. The project staff's first step in developing a model poison control system was to contact experts in the field of poison control in various European countries. Several poison control systems already in operation were studied. The staff also examined various methods of collecting data, treatment methodologies, and types of epidemiologic and demographic data that would be needed for the system.

Under the leadership of Professor Magalini, a model computerized Poison Control System was designed. It consists of:

- A mechanism to create and update a common core data bank on poisoning agents, toxicology, and treatment
- Basic protocol for data storage, recall and display
- Treatment protocols
- Parameters for system access, utilization and education of health care providers and the general public
- Administrative, organizational and personnel considerations of the poison control system at the regional and treatment level

The project staff then:

- Established an acceptable format for collecting epidemiological and demographic data
- Evolved a model for multicentric preliminary evaluation of the data and clinical results generated by the system
- Established a schedule of events for the project staff

PROGRESS AT THE NATIONAL LEVEL

Italy now boasts a model Poison Control System, which has perhaps the most effective and efficient information system of its kind in the world. Over 10,000 cases have been processed in the last few years. Italy's Poison Control System consists of:

- A comprehensive data bank on poisoning agents, toxicology and treatment methods for responding to poison incidents
- A computerized central information system that stores information on:
    - 8,000 product names
    - 6,500 generic or chemical names
    - 630 vegetable and animal denominations (common and scientific)
    - 263 different uses, and
    - 400 symptoms
- Three Poison Control Centers (in Bologna, Genoa and Chieti), each of which through its own terminals has access to both the main information data bank and a reserved computer space to accumulate, analyze and evaluate its own clinical data. In addition:

- Each center has partial access to the clinical data banks of the other centers -- partial, in that patient identity and other confidential information are excluded in order to protect patients.
- **Each center, moreover, has full autonomy in reaching clinical decisions** and the capability to generate independent data banks **on its own cases.**

Video terminals have been installed in Italy's three operating Poison Control Centers. Other cities and towns will soon have centers as well. These new satellite centers, once installed, will have (1) immediate access to the data already stored in other poison control centers and (2) a coordinated set of new clinical information on poison control cases in selected geographic areas.

PROGRESS AT THE INTERNATIONAL LEVEL

The project staff has also engendered considerable international interest in the Poison Control Center in Italy.

International information exchange has taken place since the outset. The project staff contacted international European experts on poison control from France, Belgium, and Italy, who were able to exchange information at international professional meetings. As evidence of the international interest the project has received, the project staff was invited to present details about the Poison Control Project at various international meetings.

EMS PILOT STUDY RECOMMENDATIONS

The following specific recommendations for improving poison control systems at the regional, national or international level, were endorsed by the delegates of sixteen nations who attended the September 14-16, 1980 meeting of the EMS Pilot Study in Munich, Germany.

1. The national poison control information system developed in Italy should be studied to determine its applicability in other nations.
2. National poison control information systems should:
    - Categorize hospital facilities by treatment capabilities so that poisoning victims are referred to the appropriate facility
    - Utilize epidemiological data to focus prevention activities on high risk populations

RECOMMENDATIONS (continued)

3. An acceptable international format should be established for collecting data to support epidemiological analysis, program operations, and system evaluation. Establishing a common format would enhance compatibility of data among nations.

4. Poison control centers to store, process and evaluate comprehensive information on poisoning incidents should be established as an integral part of the EMS system. These centers should also provide clinical services under medical supervision, and be associated with hospitals in the system.

CHAPTER

8

RECOMMENDATIONS

The following nations and the World Health Organization's Regional Office for Europe who sent delegates to the final Working Meeting of the NATO/CCMS Pilot Study on emergency medical service systems formulated twenty-one recommendations for domestic and international action to improve the planning and implementation of EMS systems throughout the free world:

BELGIUM
CANADA
COLOMBIA
DENMARK
EGYPT
FRANCE
GERMANY
GREECE
ITALY
LEBANON
LUXEMBOURG
NETHERLANDS
NORWAY
PORTUGAL
SPAIN
UNITED STATES

Eighteen recommendations covering the following topics were made by the forty delegates at the Working Meeting, held in Munich, Germany, September 14-16, 1980: (1) organization and management; (2) communications, first response and transportation; (3) training and public education; and (4) poison control. These recommendations as well as progress reports of the Pilot Study's projects were discussed in Chapters 4 to 7. The delegates also made the general recommendation that all 18 be applied internationally, as appropriate, through WHO or other international associations. They also proposed suggestions for follow-up action to continue the international cooperation that has resulted in so many improvements in national and international emergency medical care programs over the past ten years. The recommendations are set out below.

- ORGANIZATION AND MANAGEMENT OF EMS SYSTEMS

  1. Legislation should be passed at the national level to establish and implement the EMS program.

  2. To enhance operational responsiveness and provide data for evaluating the system, a national EMS data collection system should be instituted.

  3. Appropriate governmental authorities in each EMS service region (or service area) should determine the capability of each hospital within the region to handle specific types of emergencies, and give direction on all aspects of regional EMS operations.

4. A system for categorizing patients based on the nature and severity of their injuries should be developed. This will ensure that each patient in need of emergency care is transported to the hospital capable of providing the treatment that is most appropriate for the medical condition of the patient.

5. A government agency, council, or institute representing all aspects of EMS delivery should be established at the national level to ensure that:

    - Direct services are properly planned, delivered, and evaluated in each region (or each service area).

    - Government appropriating and funding authorities are properly advised of the performance and effectiveness of the system.

- COMMUNICATIONS, FIRST RESPONSE AND TRANSPORTATION

1. National and international standards should be developed for EMS transportation, first response, and communications equipment.

2. In several countries, rotary and/or fixed-wing emergency transportation has proven effective in certain circumstances. It is therefore recommended that governments study the feasibility of using aircraft for emergency transport.

3. Rotary and fixed-wing EMS operations should be coordinated and directed by a government health authority.

4. An EMS communications system (telephone and radio) should be developed, at the appropriate level, to permit direct communication with responsible medical authorities. This will ensure coordination of pre-hospital and hospital treatment and maintain medical control of EMS operations throughout the intervention.

- EMS TRAINING AND PUBLIC EDUCATION

1. EMS training and public education programs should be an integral part of the EMS system.

2. Training programs should be such that laymen, public officials (police and fire), and emergency medical personnel in all capacities are able to render assistance appropriate to their roles in the system.

3. Education for the general public should include, at a minimum, information on (a) first-aid, (b) simple life-saving techniques, (c) accident prevention, and (d) how to access the EMS system. An all-media approach should be used to disseminate this information. Children of all ages should receive EMS education in school.

4. EMS professional and support personnel in all capacities (ambulance drivers, rescue pilots, nurses, medical students, physicians) should not only receive initial training in all aspects of emergency health care, but must be given refresher courses to keep them up-to-date on recent advances in emergency care.

5. National standards for training EMS personnel should be developed. The standards then should be evaluated as a basis for determining a set of minimum international EMS training standards. Mechanisms should be developed for disseminating and implementing these minimum standards worldwide.

- POISON CONTROL

1. The national poison control information system developed in Italy should be studied to determine its applicability in other nations.

2. National poison control information systems should:

   - Categorize hospital facilities by treatment capabilities so that poison victims are referred to the appropriate facility.

   - Utilize epidemiological data to focus prevention activities on high risk populations.

3. An acceptable international format should be established for collecting data to support epidemiological analysis, clinical operations, and system evaluation. Establishing a common format would enhance compatibility of data among nations.

4. Poison control centers to store, process, and evaluate comprehensive information on poisoning incidents should be established as an integral part of the EMS system. These centers should also provide clinical services under medical supervision, and be associated with hospitals in the system.

- INTERNATIONAL FOLLOW-UP

Recommendations for follow-up action to continue international cooperation in planning and implementing improved regional, national, and international emergency medical systems were:

1. A World Congress on Emergency Medical Services should be held in the fall of 1981 or as soon as possible thereafter in the United States. Its purpose will be to coordinate future action on the EMS projects of the EMS Pilot Study and to decide on mechanisms for encouraging more nations to establish or improve emergency medical services systems.

2. The delegates welcome the World Health Organization's provisional proposal to assume sponsorship of the EMS Pilot Study during the 1981-82 follow-up period. WHO sponsorship, the participants believe, will inspire many more of the world's developing nations to upgrade their emergency medical systems.

3. The delegates also welcome WHO intent to establish an EMS Advisory Committee to begin planning activities to carry on the work of the Pilot Study, which has done so much to focus international attention on this critical area of health care.

APPENDIX A

EMERGENCY MEDICAL SERVICES SURVEY QUESTIONNAIRE

NATO COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY
AND
THE WORLD HEALTH ORGANIZATION

PILOT STUDY ON IMPROVING EMERGENCY MEDICAL SERVICES

EMERGENCY MEDICAL SERVICES
SURVEY
QUESTIONNAIRE

Address: E.M.S. Survey,
Emergency Services Division,
Medical Services Branch,
Health and Welfare Canada,
Ottawa, Canada.
K1A 0L3

JANUARY 1980

The term "emergency medical services system" denotes a network of services that provides for detection and reporting of medical emergencies, care at the scene, transport and care en route to hospital and reception and immediate care of the patient at the hospital.

A. Background Information

Please prepare a brief overview of the following information:

- The history of the national Emergency Medical Services system
- Traditional organization and financing of emergency medical services
- Current status: Authority
  Management/Organization
  Major Policies
  Resources
- Major needs and problems
- Plans for future development

B. Survey Questions on Specific Topics

1. EMS Authority/Responsibility

What ministry, government office or agency has prime responsibility for emergency medical services on the national level? What other offices or agencies participate and in what way? If there are documents presenting the overall national organization please send these with this report.

2. Regional Programs

If your country's emergency medical services have been organized on a regional basis, please enclose a map marking regions that have been established. For each region please indicate the population, resources, and such plans and problems as may be peculiar to the region. (If there is no such regionalization, please indicate).

3. Laws and Regulations

Are there laws or regulations dealing with emergency medical services in your country? Yes____ No____ If so, please enclose a list or preferably copies of the relevant documents. (Such documents may include regulations regarding ambulance and equipment standards, training requirements, licensure and certification, radio communication frequencies and any other aspects of emergency medical services.)

4. Information and Education for the General Public and for Specific Audiences

4.1 Please check (✓) the programs of public information and education, related to emergency medical services, that are being carried out in your country.

	Mode of Public Information & Education				Responsible Agency
	Radio	TV	Press	Courses	
4.1.1 Accident Prevention					
a) Home					
b) Roadway					
c) Industry					
d) Schools (eg. sports)					
4.1.2 Other Hazardous Areas or Behaviours (eg. Water Safety) Specify: ____________					
____________					
____________					
____________					
____________					
4.1.3 Methods of Access to EMS					
4.1.4 First Aid					
4.15 Other Specify: ____________					
____________					
____________					
____________					
____________					

4.2 Please check (✓) the programs provided for specific audiences related to emergency medical services that are being carried out in your country.

Programs for (✓)

	Trainers	Trainees
4.2.1 Schools Elementary School		
- access to EMS		
- First Aid		
- Safety (Accident Prevention) Programs		
Advanced School		
- access to EMS		
- First Aid		
- Safety (Accident Prevention) Programs		
4.2.2 Industry and Business - access to EMS		
- First Aid		
- Safety (Accident Prevention) Programs		
4.2.3 Other (Specify)		
________		
________		
________		
________		
________		

5. Emergency Communications

5.1 Please describe the arrangement for emergency communication centers and their linkages with ambulances, hospitals and other related public services. What is the responsible agency for this service?

5.2 Are radio frequencies dedicated to emergency medical communications, or shared with other services? What is the authority or responsible agency for radio frequency assignment?

6. Ambulances and Other Emergency Vehicles

Please send us a statement or documents related to the specifications listed below and indicate the responsible agency:

6.1 Vehicle Design - dimensions, safety features, equipment and other standard specifications.

6.2 Identification - colours, symbols, lights, warning devices (siren, bell, etc.)

6.3 Special Vehicles (for serious emergencies, such as, respiratory and cardiac crises or life-threatening trauma): please indicate differences in basic vehicle design, equipment, identification and communication apparatus.

6.4 Standards for air and sea rescue vehicles.

(If such specifications do not exist in your country, please indicate).

7. Hospitals

Are there policies, in your country, regarding the designation of certain hospitals to receive patients with specific emergency medical problems? Yes_____ No_____
If so, please send us documents or descriptions of the criteria and process by which these hospitals are designated or classified. What is the agency or authority responsible for designation or classification?

8. Personnel

8.1 Please indicate the requirements for special training, licensing or certifying personnel involved in emergency medical services and enclose any available documents, course descriptions or other information. Such personnel may include emergency physicians, emergency nurses, emergency medical technicians, ambulance attendants, emergency communication personnel and any other personnel specializing in emergency medical care. What is the agency or authority responsible in each case?

8.2 Are there special training programs available for other health care personnel in emergency medical care procedures? Please indicate one of the agencies responsible for the course in each case

	(✓)	Agency Responsible
Nurses		
- Emergency nursing		
- Cardio-pulmonary Resuscitation		
- Intensive care		
- Coronary care		
- Poison control		
- Disaster training		
- EMS systems		
Medical Students		
- Cardio-pulmonary Resuscitation		
- EMS systems		
- Drowning		
- Traumatology		
- head & face		
- thorax		
- limbs		
- spine		
- abdomen		
- obstetrics		
- paediatrics		
- cardio-vascular		
- poison control		
- disaster training		
Special Post-Graduate Programs		
- Anaesthesiology & cardio-pulmonary resuscitation		
- Traumatology		
- neurosurgery		
- chest surgery		
- abdominal surgery		
- orthopedics		
- drowning		
- cardiology		
- paediatrics		
- obstetrics		
- psychiatry		
- disaster medicine		
- burns		
- poison control		

9. EMS Data Collection

9.1 What ministry(ies), government office(s) or agency(ies) is/are responsible for:

a) collecting and compiling data regarding emergency medical services (for example, emergency calls, ambulance runs, air rescues, hospital emergency visits). Please enclose any available compilations of emergency medical service statistics.

b) funding and coordinating research projects and reports.

9.2 Are there other sources for EMS research funds? If so, please list.

9.3 Please provide a list of current research projects of which you are aware.

10. Disaster

Are there policy guidelines or plans, in your country, for handling mass casualties? Yes_____ No_____
If so, please send us documents or descriptions covering the following:

10.1 Hospital plans

10.2 Community health services plans for disasters

10.3 Regional plans for coordination between community health services and hospital plans for disasters.

10.4 Rail, air and highway disaster plans and degree to which they are coordinated with the above.

10.5 The offices or agencies responsible for mass casualty treatment plans and programs.

11. Special Features

Are there any unique policies, programs, problems or features of emergency medical services in your country which you would like to share with us?

12. Special Needs

12.1 What information regarding emergency medical services in other countries would be of value to you?

12.2 What expert consultants may be helpful for your country in planning, implementation or evaluating advances in emergency medical services?

APPENDIX B

EXPANDED RESPONSES TO SPECIFIC TOPICS ON THE CCMS/EMS 1980 SURVEY

EXPANDED RESPONSES TO SPECIFIC TOPICS
ON THE CCMS/EMS 1980 SURVEY

This Appendix is Part 3 of the report of Project 1 of the EMS Pilot Study. It presents further details of the 1980 Survey responses from the following eleven respondents:

- Belgium
- Canada
- France
- Greece
- Iceland
- Italy
- Luxembourg
- Netherlands
- Portugal
- United Kingdom
- United States

A table summarizing specific responses to the survey questions is included at the end of this Appendix.

• BELGIUM

1. EMS Authority/Responsibility

The Ministry of Public Health and Family is responsible for almost all aspects of the emergency medical services system -- care at the scene, transport and hospitalization. Some responsibility is still borne by the Public Assistance Commission, and the Ministry of the Interior directs all communications.

2. Regional Programs

While Belgium is not organized into regional programs, there is a regional budget for ambulance driver training.

3. Laws and Regulations

A law passed in 1964 covers all emergency medical services in Belgium. It was modified in March of 1972. The law is also affected by provisions of the Arretes Royaux dated 4/1/65, 4/2/65, 5/7/65, 5/22/65, 12/1/65, 2/29/68, and 4/29/70, and by several ministerial interpretations. In addition, a law was passed in 1976 covering emergencies in private places. The Public Assistance Commission is responsible for administering the law.

4. Education Programs

Belgium's Road Safety Council (SECURA) prepares accident prevention courses for dissemination by the media (radio, television and the press). The Belgian Red Cross gives courses in first aid for the general public. Nurses involved in emergency medical services or teachers give first aid and accident prevention courses in elementary and secondary schools. The Ministry of Works is responsible for providing first aid and accident prevention courses for business and industry.

5. Emergency Communications

The Ministry of the Interior is responsible for Belgium's communications centers. A band of frequencies is reserved for rescue services, including emergency medical services, fire rescue, civil defense and the ten university hospitals. Two other national frequencies are reserved for the above services and one is reserved for all hospitals having a permanent physician to treat emergencies. Frequencies are allocated by the National Telephone and Telegraph Board.

Belgium also has a Central 900 emergency telephone response service, which is operated by the Fire-Brigades.

6. Transportation (Ambulances and Other Emergency Vehicles)

Ambulance services with approved vehicles must comply with the provision of Document 900/AMB/7/1975, entitled "Conditions auxquelles doivent repondre les services d'ambulance disposant d'un vehicule approprie." This document outlines the requirements for the organization of the service, personnel, vehicles and equipment.

At present, 476 ambulances meet the requirements of the abovementioned document. Of these, 357 vehicles belong to the Ministry of Public Health and Family, which places them at the disposition of various public services (fire departments, public assistance centers, civil defense, etc.). They are painted ivory, have a strip of reflective red tape down the middle and are equipped with a two-tone siren and blue flashing lights.

The Ministry's 357 ambulances include 317 identical light vehicles, which are equipped in accordance with requirements of 900/AMB/1975, and 40 large resuscitation ambulances that are equipped to carry out ECG, difibrillation, etc.

Belgium has no standards for air/marine rescue vehicles. A National Police helicopter service provides emergency rescue services. An Alouette III helicopter, the property of the Civil Defense, is also available.

7. Hospitals

Currently, 198 hospitals meet the 1966 legal requirements for admitting emergency cases. Hospitals eligible to provide emergency services must supply such basic services as resuscitation, blood transfusion, oxygen therapy, x-ray and laboratory work. The emergency services section of qualified hospitals is under the direction of the Department of Surgery.

More elaborate EMS eligibility standards for hospitals are presently being studied. For example, the National Council on Programming is sponsoring a proposal that would reduce the number of hospitals now part of the emergency services system from 198 to 50 or 60 hospitals. The Council also is proposing that a two-level service be adopted -- one level called university hospitals, the other, regional hospitals.

8. Personnel

Ambulance personnel must take a 20-hour course, which covers rescue, resuscitation and first-aid for accident victims. Refresher courses must be taken every five years.

The National Study Commission on EMS has proposed that the duration of the course be changed to a minimum of 60 hours, with refresher courses after five years.

Certain initiatives have been taken to specialize nurses in emergency medical care, coronary care and intensive care. The National Poison Control Center also provides courses on poison.

EMS training for physicians has mainly involved preparing specialists in anesthesia, resuscitations, and traumatology.

9. EMS Data Collection

The Ministry of Public Health and Family gathers and analyzes data on emergency calls, ambulance services and emergency hospital admissions. The Ministry also finances and coordinates EMS survey research projects and reports.

10. Disaster Plans

Legally the Ministry of the Interior, through its civil defense mandate, coordinates rescue operations in the event of disaster. It directs the Civil Defense Corps and fire-fighters. Special agreements assure cooperation with the Ministry of Public Health.

Civil Defense prepares general and special plans ranging from plans for war to those covering train and air disasters. All concerned departments, especially Public Health, cooperate in preparing these plans.

- CANADA

1. EMS Authority/Responsibility

In Canada, hospitals and ambulance services are under the aegis of the ten provincial governments. Four provinces -- British Columbia, Manitoba, New Brunswick and Ontario -- provide ambulance services on a provincial basis. The six other provinces, the Northwest Territories and the Yukon are gradually beginning to provide ambulance services.

Two provinces, Saskatchewan and British Columbia, provide air ambulance service to their citizens. Air transport service is provided by five provincial governments -- Yukon, Northwest Territories, Manitoba, Alberta and Newfoundland. Ontario, which has recently conducted a "pilot study" on helicopter ambulance services, is now expanding its helicopter capability.

Air/Sea Rescue of the Department of National Defense, in combination with the Department of Fisheries and the Canadian Coast Guard, provide rescue services.

2. Regional Programs

Canada's services are divided along provincial and territorial lines with some provinces subdividing services by region.

3. Laws and Regulations

Five provinces have specific regulations governing the operation of ambulances, the medical equipment in the vehicles, and the qualifications of ambulance personnel.

For the most part, ambulance regulations are covered in provincial Public Health Acts. However, several provinces have passed specific legislation covering emergency vehicles.

For example, in British Columbia, the ambulance services operate under the Emergency Health Services Act of 1974. Alberta recently completed a review of emergency services within the province and drafted proposed regulations. In 1980, Saskatchewan established new regulations under the Public Health Services Act, which expand on some 1958 regulations covering ambulances. Ambulances in Manitoba are subject to Regulation P.210 R.7 of the Public Health Act. Ontario has an Ambulance Act (1976) which established specific regulations for these vehicles. Quebec has specific acts or regulations under the 1976 Public Health Protection Act.

In most of the provinces that have no specific acts or regulations, the Health Department has issued specific guidelines for ambulance vehicles, equipment and their use within the province. These guidelines must be adhered to as a condition of provincial funding or subsidies.

4. Education Programs

A number of associations in Canada offer education programs for the general public on topics such as first aid, water safety, accident prevention and cardio-pulmonary resuscitation. These associations include the Canadian Heart Foundation, Royal Life-Saving Society, Canadian Red Cross, St. John Ambulance and Canada Safety Council, among others. Various media promote this basic EMS information.

Elementary schools also provide programs on basic first-aid, safety and accident prevention to younger students. For older students similar prevention information is part of driver education programs, which are conducted both by schools and private agencies.

Safety in the workplace is promoted by the Workmen's Compensation Board in conjunction with the Department of Labor. In addition, a Safety Oriented First Aid (SOFA) program has been developed by St. John Ambulance to reduce accident rates.

All first aid, CPR, and water safety courses must be conducted by qualified instructors.

5. Emergency Communications

Because of its large land mass, long distance communications play a major role in Canada's emergency services. Canada has no nation-wide emergency telephone number, largely because the telephone companies are operated on a regional basis. However, the Province of Ontario now has a seven digit emergency number that connects directly with ambulance services. A similar emergency number is available in the greater Winnipeg, Manitoba area. A number of other provinces are considering establishing an emergency telephone number.

All vehicles in the Emergency Services are equipped with two-way radios connecting to either a dispatch center or its base, which is generally located at a hospital. Allocation of radio frequencies for emergency purposes is controlled by the federal Department of Communications. Proposals have been made to the Department of Communications asking for greater control over the allocation of radio emergency frequencies. The Department of Communications also has attempted to coordinate the use of radio frequencies with the frequencies used by Emergency Services in various states which border on Canada.

There is considerable variation in the technical set-up of emergency radio communications within the provinces. In most provinces, one frequency is assigned to ambulance services. This enables the vehicles to connect with either a large area dispatch center or smaller hospital-based centers. However, Ontario recently instituted a computerized dispatch service, and a similar service was instituted in the greater Winnipeg area. Alberta has made a complete study of communications for air and ground services in the last year.

In Northern Canada, ionospheric activity periodically interferes with radio communications.

6. Transportation (Ambulances and Other Emergency Vehicles)

Emergency vehicles and their equipment are generally controlled by provincial regulations or, where these are absent, by guidelines established by provincial Departments of Health.

There is a growing trend to use larger, four-wheel drive vehicles. These larger vehicles permit easier access to stretcher patients, particularly when operators are performing cardio-pulmonary resuscitation or setting up intravenous apparatus. Vehicles usually have special insulation and heaters because of severe climatic conditions. All ambulances carry oxygen equipment and motor-operated suction apparatus. A number of provinces are using high visibility colors on emergency vehicles.

One province, Ontario, recently began testing a dedicated helicopter service in the greater Toronto area. The province is considering expanding this service. Highly sophisticated helicopters and medical equipment were used in this project and the staff had specialized training. It has been proposed that the air ambulance service be expanded to include fixed-wing aircraft.

7. Hospitals

Canada has no specific policies for designating certain hospitals to receive patients with specific medical problems. In other words, hospital categorization has not yet been universally accepted. However, a number of localities have made agreements regarding the transfer of patients for continuing care once their condition is stabilized.

A federal/provincial group is now developing guidelines for pre-hospital emergency care and hospital emergency units. These guidelines will incorporate suggested standards for the staffing and equipping of hospital emergency units of varying capabilities.

8. Personnel

Requirements for the education and training of ambulance personnel are specified under relevant provincial acts and regulations. These requirements vary considerably from province to province, ranging from standard first-aid training to emergency medical technician courses.

Emergency departments in the country's larger teaching hospitals are now usually staffed by emergency physicians. Most of these physicians are trained in Canada. Some of the more experienced emergency physicians have applied for American Board Certification. Most emergency physicians are medical personnel who have completed post-graduate work in surgery, internal medicine or family medicine. Some emergency physicians were formerly general internists. Several universities now offer resident training programs in emergency medicine, which are usually three years long.

Both the Royal College of Physicians and Surgeons and the College of Family Physicians are beginning to recognize emergency medicine as a separate specialty. It is expected that criteria for preparation, accreditation and certification in emergency medicine will be established in the near future. The Canadian Association of Emergency Physicians is also actively promoting and lobbying for the recognition of emergency medicine as a specialty.

A survey conducted in 1975 revealed that approximately forty percent of the nurses working in emergency units had post-basic preparation in emergency, intensive care, coronary care or operating room nursing programs. Since that time the number of post-basic courses in emergency and critical care has increased at both the hospital- and university-level across the country. Also available are advanced courses in emergency health care specifically designed for nurses who will be working in remote locations, such as the far north, where physicians are not always available.

9. EMS Data Collection

STATISTICS CANADA annually collects data on hospital emergency unit visits, other out-patient visits or procedures, and emergency unit staffing. Each province also collects data on ambulance services. There is, however, no standard format for these data.

10. Disaster Plans

Disaster planning in Canada is carried out as a function of federal and provincial government departments. Emergency Planning Canada, which is managed by the Privy Council Office of the Canadian government, acts as the overall coordinator at the federal level. There are counterparts in each of the provinces.

In the health and social services fields, responsibility for advising and assisting the provincial departments of Health and Welfare rests with the Department of National Health and Welfare. Through their emergency planning divisions, the provincial Departments of Health and Welfare draw up plans for the health, medical and social services aspects of disasters.

Canada encourages coordinated community planning for disasters. Community plans to cover an airport disaster, for example, might involve planning and testing the response of fire, police, ambulance, medical, hospital volunteer agencies, etc.

The Canadian Council of Hospital Accreditation also cooperates in national disaster planning. The Council's Guide to Hospital Accreditation includes standards requiring hospitals to have disaster plans for receiving casualties, evacuating the facility or responding to internal emergencies such as fire.

The federal Department of Health and Welfare has also developed manuals, guides and courses related to disaster planning. These publications are available to provincial health and welfare emergency services for distribution to appropriate agencies. In addition, a number of courses for candidates selected by the provinces are conducted each year at a federal study center located near Ottawa.

11. Special Features

For more than a decade now, Poison Control Centers have been operating out of the larger teaching hospitals in Canada's major cities. The telephone numbers of these centers are listed in the city directories, making it easy for citizens to obtain medical advice in the event of accidental poisoning.

The Department of Transport has set up a similar advisory and response network to handle large-scale chemical spills. This emergency services also has a toll free number, which is manned on a 24-hour basis. Recently, following a major chemical spill, the entire population of Mississauga -- more than a quarter million people -- was evacuated for approximately seven days in a multiphase operation.

Canada is also experimenting with telecommunications as a means of communicating with oil rigs in emergencies. Experiments have involved the use of long distance transmission by x-ray and satellites.

A persistent problem in Canada's emergency health care program concerns the transport of medical emergency patients over long distances in extremely cold weather.

• FRANCE

1. EMS Authority/Responsibility

In France, the Ministry of Health is responsible for the Emergency Medical Aid Services (SAMU) at the national level. SAMU is a part of France's insured health services. Other ministries participate in the management of certain services. For example, the Fire-Brigade, which responds to certain types of health emergencies, is under the authority of the Ministry of the Interior; the National Police, who play an important role in community alerts, are subordinate to the Ministry of Defense; the Plan Administration Division, under the authority of the Prime Minister, is responsible for ensuring that sufficient funds are available to the SAMU.

The prefets, who represent all the ministries, are responsible for establishing plans for first-aid to accident victims and other persons in distress. In larger cities and towns where sufficient funds are available, the Mayor is responsible for establishing emergency medical services.

2. Regional Programs

Emergency medical services in some regions of France encompass many departments. Responsibility for delivering these services is distributed among the regions. The regional concept of emergency health care is important in France in the sense that in every region, a specific hospital and a university have been designated to provide anesthesia and resuscitation services. The regional concept will continue to play an important role in establishing and developing hospital mobile units and the SAMU.

3. Laws and Regulations

All attempts to get Parliament to pass a general law on SAMU have failed. Nevertheless, there is a law covering health transportation, dated July 10, 1980. The government also has written a great many articles on private ambulance services, vehicles, personnel, etc. France's hospital mobile units (medically equipped ambulances), a key aspect of the total emergency care system, were established by an Order in Council on December 2, 1965.

4. Information and Education Programs

The SAMU and the Civilian Security in the Ministry of the Interior coordinate public education programs.

5. Emergency Communications

France's Emergency Medical Aid Services (SAMU) are effectively the country's communications centers. They are also central dispatch centers that are responsible for deploying emergency service personnel. They act as regional command posts and are directed by the governing physicians in the service area. SAMU posts are located in hospitals, which are generally situated in the center of each region. The groups responsible for emergency communications therefore, are the Administrative Councils of the hospitals where SAMUs are located.

Each SAMU is connected by radio to the fire department, the local police and the national police. Initially, a radio communications network was used to deploy non-medical services in cases of fire or disaster. However, in 1960, an agreement was made between the Ministry of the Interior and the Ministry of Health to respond to medical emergencies as well. This agreement was strengthened by an inter-ministerial letter in 1973.

Emergency radio frequencies are still shared with other public services. However, another radio network is being established that will have special frequencies reserved for SAMU. This will permit direct communications between the SAMU, private mobile groups, doctors, nurses and ambulances. All of France's frequencies are now designated by the Ministry of State for the Ministries of Posts and Telecommunications in a general manner. However, the Ministry of the Interior, as indicated above, has arranged for certain frequencies to be used by the Ministry of Health.

6. Transportation (Ambulances and Other Emergency Vehicles)

There are two principle types of vehicles intended for use as patient transport. One type of vehicle is defined in Annex I of the amended Order in Council of March 27, 1973; another is defined by the French Association for Standardization (l'Association Francaise de Normalization) under the title "The Health Care and

Emergency Care Ambulances" (Ambulance de Soins et de Secours d'Urgence). The last vehicle was standardized in 1971 and reiterates the specifications outlined for hospital mobile units in 1965. The amended 1973 Order in Council (6.1) defined the basic ambulance. Health Care and Emergency Care ambulances correspond to special vehicles (6.3), defined in the same Order. These two vehicles are differentiated by size, equipment, and function.

France also has helicopter bases near the coast to handle certain rescue situations.

7. Hospitals

France has a formal system for classifying public and private medical facilities that serve the public. In 1959, a circular to the prefets encouraged them to develop services to receive car accident victims, and to do so in accord with the quality and quantity of services available. This circular had a major impact on emergency health care at the time. However, on April 17, 1980, an Order in Council classified all public and private institutions which serve the public.

France has approximately 400 hospitals equipped to receive casualties from highway accidents. More than 200 of these have mobile units to provide rescue and medical aid. There are thousands of additional ambulances owned by Fire-Brigades and other private enterprises, however. To date 72 dispatch centers (SAMU) have been established.

Hospitals are classified in four categories: the community hospital, the general hospital, the specialized hospital and the regional hospital. The Ministry of Health is responsible for classifying hospitals.

Each type of hospital has special requirements. A general hospital, where the SAMU headquarters are usually situated, for example, must have the following units: reception, emergency, anesthesiology, resuscitation, general surgery, etc. Regional hospitals, which are located in large metropolitan areas in the region, must have the same units as community hospitals as well as a scanning unit and a rehabilitation unit.

This classification system makes it possible to set up a list of health facilities capable of receiving emergencies. Hospitals capable of handling different emergency care cases are located in very old villages, at communications routes, and in the center of heavily populated areas within each service region.

8. Personnel

Doctors and auxiliary health care personnel are not required to have special certification for emergency care. Nevertheless, medical care personnel are taking advantage of EMS training programs available now in an increasing number of universities. Ambulance attendants are trained in centers especially created for this purpose. Most of these centers are close to the SAMU. They are directed and supervised by physicians who have experience in emergency care. These emergency centers, for the most part, also train other emergency care personnel -- police, doctors, firemen, stretcher bearers, etc.

9. EMS Data Collection

The Ministry of Health has the prime responsibility for collecting and analyzing EMS data. This is a complex task because the information system in France is not standardized.

In the Ministry, the Statistics Division and the Data Processing Division collect a great deal of national data on emergency medical services. In addition, every SAMU is required to compile its own statistics. Maintaining national health statistics is strongly encouraged by the Ministry of Health.

The Ministry of Defense also compiles statistics on traffic accidents. The Ministry of Interior is involved in certain research activities, including a study of the use of helicopters.

France is also carrying out a research project on medical communications control.

10. Disaster Plans

France has a disaster plan which is designed to ensure the implementation of five services under the authority of the prefets. These services are: Police and Liaison, Rescue and First Aid, Mutual Aid and Medical Care, Transport and Works Services, and Coordination.

The Ministry of Health is responsible for the Mutual Aid and Medical Care Services in the plan. These services have been reorganized to include the SAMU in the plan. The senior doctor of the SAMU is the Director of Medical Care Services.

In accordance with a 1974 Order in Council, regulations require every hospital to develop a plan to receive sick or injured who require emergency care. These regulations must identify:

- Normal reception of one or more sick or injured persons not requiring extraordinary care
- Reception of a high number of sick or injured for whom certain health care measures must be taken
- Reception of a number of sick or injured such as those who cannot receive complete care at the original receiving facility and must be evacuated to another hospital better suited to treat them

The Mutual Aid and Medical Care Services provide for interregional mutual aid. The disaster plan covers railway, air, and road emergencies. Coordination with general public service systems is satisfactory.

For aircraft disasters at airports, special plans have been established by airport authorities in liaison with the fire department, hospitals, etc. The Ministry of Health is primarily responsible for plans and programs to treat mass casualties in time of peace or war. The Ministry of the Interior Civil Defense also plays a role.

11. Special Features

France is still experiencing some difficulty in health transportation, particularly ambulance transportation, which hinders the quality of the system.

12. Special Needs

France welcomes information on all aspects of emergency medical care, especially that dealing with ambulance transportation and communications. France has considerable experience in the area of emergency medical services and boasts highly qualified emergency health care personnel. Hence, the country has no need for special EMS consultants. EMS experts, however, look forward to continued information exchanges with EMS experts from other countries.

• GREECE

1. EMS Authority/Responsibility

The Ministry of Health and Social Security is responsible for emergency medical services at the national level.

2. Regional Programs

EMS services are not organized on a regional basis in Greece. The country has recently started a program in Athens in this direction through the creation of an Emergency Medical Ambulance Center. The Center serves only the greater Athens area.

3. Laws and Regulations

There are no specific laws or regulations for emergency medical services in Greece except for certain regulations covering the Ambulance Center in Athens. The regulations do not cover equipment or operational aspects of the service.

4. Education Programs

Public education and information programs are prepared by the Ministry of Health, the Automobile Association and the Ministry of Labor. Programs cover accident prevention in the home, on the highway, and at the workplace. The Red Cross also gives first aid courses. No programs are given in the schools.

5. Emergency Communications

Effective radio communications for medical emergencies exist in the Athens area, but elsewhere the situation is far from satisfactory. The system in Athens has dedicated radio frequencies, which allow physicians stationed at the Emergency Medical Ambulance Center to instruct ambulance personnel located at the emergency scene.

Athens also has an emergency telephone number ("166"), which gives callers immediate access to the Ambulance Center.

6. Transportation (Ambulances and Other Emergency Vehicles)

There are no general guidelines or specifications for standardizing road ambulances or rescue boats and aircraft. Ordinary Volkswagen or Dodge vans are modified locally and generally equipped with oxygen, a chairlift, a stretcher, and a seat for the attendant (nurse). Ambulances are painted yellow or white, are marked with a "166", and have a siren and flashing blue lights.

The government owns all ambulances and they are stationed at government-owned hospitals. There are not enough ambulances or trained personnel to service the country.

7. Hospitals

The total hospital bed capacity is equally split between government-owned hospitals and private clinics. The private clinics tend to be relatively small and dispersed. All ambulances are owned by the government and stationed at the government-owned hospitals. Most transportation to private clinics is by taxi or private autos.

8. Personnel

There are no speciality courses or certification for EMS personnel; however, nurses and ambulance attendants are required to have general nursing or first-aid qualifications, respectively.

9. EMS Data Collection (None)

10. Disaster Plans (None in Process)

11. Special Features/Programs

No hospital has a designated emergency or casualty unit. All emergency cases are handled directly or through out-patient departments. Only two cities, Athens and Salonica, have hospitals capable of dealing with emergencies involving children or accidents. Many serious cases thus have to be transported great distances with minimal medicare support en route. Frequently, ambulances are dispatched from Athens to handle such patients since provincial centers may have only one ambulance available.

A major study is currently underway to review these problems and design a suitable EMS system.

• ICELAND

1. EMS Authority/Responsibility

The Minister of Health and the National Health Head Physician are responsible for managing Iceland's emergency medical services. The National Civil Defense Organization is responsible for hospital and medical coordination in mass disasters.

2. Regional Programs

Iceland's emergency health care system is organized into eight regions, one of which is the capital Reykjavik. Comparative statistics for these areas are as follows:

Region	Population	Hosp. Beds	/1000	Doctors	/1000
A*	87,000	1112	12.8	310	3.6
B	13,000	119	9.1	19	1.5
C	9,000	64	7.0	11	1.2
D	13,000	158	12.3	12	0.9
E	24,000	195	8.2	35	1.5
F	13,000	90	7.2	12	1.0
G	19,000	78	4.0	22	1.1
H**	46,000	157	3.4	24	0.5

* Reykjavik
** Location of International Airfield

3. Laws and Regulations

In addition to the requirements of the National Health Service, Iceland's Civil Defense Law requires the Director General of Public Health to administer the aspects of civil defense which involve hospitals, medical treatment, and nursing. It requires hospital managers to prepare and implement measures necessary to receive and treat the injured. Additionally, hospital managers are responsible for preparing and operating reserve hospitals.

4. Information and Education Programs

The Icelandic Lifesaving Association and the Fire Department have undertaken the teaching of accident prevention courses for the general public and school children. Traffic councils and sports clubs provide courses on topics, such as highway and sports safety. The Icelandic Lifesaving Association and the Red Cross conduct first-aid courses in both elementary and secondary schools. However, industries and businesses are responsible for initiating their own first-aid courses and safety programs.

5. Emergency Communications

In Reykjavik, the ambulance service is operated by the Fire Department. The ambulance service is equipped with direct telephone lines to police headquarters and uses specifically designated radio frequencies.

While hospitals or Red Cross Chapters in other parts of the country operate ambulance services, they usually share radio frequencies with other services.

In disaster situations, the National Civil Defense Emergency Operating Center coordinates the ambulance services. The National Telephone Company is responsible for assigning radio frequencies.

6. Transportation (Ambulances and Other Emergency Vehicles)

Currently Iceland has no standards for ambulances. However, the Icelandic Red Cross and the Ministry of Health are currently working on this issue.

7. Hospitals

The three major hospitals in Reykjavik have an arrangement which designates which hospitals will handle brain surgery, ophthalmology, and burn cases. This is part of a traditional agreement between the three hospitals.

8. Personnel

There are no specific post-basic courses in emergency health care for either physicians or nurses. Nursing education is the responsibility of the Icelandic State School of Nursing. The Icelandic State University is responsible for the education of medical students.

9. EMS Data Collection

Responsibility rests with the Ministry of Health, particularly the National Health Head Physician. Iceland has no mechanism for national or private research grants.

10. Disaster Plans

As noted in item (5) above, each hospital manager makes his own plans for disasters. Disaster plans are coordinated with the National Civil Defense, which also oversees the community civil defense planning. Rail, air, highway disasters, and similar crises are included in community civil defense plans. The National Civil Defense agency and the Medical Service are responsible for disaster response.

11. Special Features

In Iceland, scout rescue teams assist the medical services in emergency and disaster situations, rendering first aid and assistance at hospitals.

- ITALY

1. EMS Authority/Responsibility

In Italy the Ministry of Health has primary responsibility for emergency medical services at the national level. All plans are developed at the regional level, however.

2. Regional Programs

As noted, health and medical care services are delivered on a regional basis. Regional Health Authorities play a major role in health care planning and in allocating funds for medical services within the region.

3. Laws and Regulations

In Italy laws and regulations dealing with emergency medical services are developed at the regional level.

4. Information/Education

Public information and education programs in accident prevention, first-aid, water safety, and how to access the EMS system and first-aid have been actively developed in Italy. An all media approach is used. Radio and television stations and the press teach accident safety and promote the abovementioned topics.

The Ministry of Public Education sponsors accident prevention programs in the schools, particularly in connection with sports injuries. Both the university system and the Navy provide safety training and instruction in skin diving. The press promotes first aid by printing general information on safety, first aid, and how to access the EMS system.

Both elementary and secondary schools provide first-aid programs. The Ministries of Health and Labor sponsor safety and accident prevention programs for business and industry. In addition, special courses in maritime safety are offered to prevent and respond to sudden illnesses or accidents at sea.

5. Emergency Communications

The police are responsible for emergency communications arrangements and linkages to hospitals and related services. A state agency allocates radio frequencies with appropriate national clearance.

6. Transportation (Ambualance/Emergency Vehicles)

All ambulances are owned and operated by Regional Health Authorities. No private ambulances operate in Italy. Regional authorities also establish specifications for ambulance vehicles, life support equipment and personnel.

The armed forces (Air Force and Navy) assist in civilian search and rescue missions. Specially-trained military personnel provide life support in major accidents. For diving accidents, the use of mobile hyperbaric chambers is presently under study.

7. Hospitals

Regional Health Authorities designate hospitals within their own service area based on treatment capabilities.

8. Personnel

The Regional Health Authority has responsibility for the orientation of health care personnel and the development and implementation of special training programs for professional and paraprofessional personnel. University medical schools, schools of nursing and professional associations cooperate in designing and teaching these programs. For example, they give courses for nurses in emergency, CPR, intensive care, coronary care, and EMS systems; in drowning and traumatology for medical students; and post basic courses for physicians in anesthesiology and cardio-pulmonary resuscitation.

9. EMS Data Collection

Italy has no centralized EMS data collection system. Some data are collected at the regional level. The Ministry of Health can request regional information for analysis.

The state provides research funds for research projects through Regional Health Authorities. There is no private research funding in Italy. Current research projects include a study of the poison control system, an examination of mobile hyperbaric chambers for diving accidents, and a variety of training and education programs in emergency health care.

10. Disaster Plans

The Ministry of Health has developed guidelines for national and regional responses to mass casualties. These are included in hospital emergency plans. Both National and Regional Health Authorities and the Army have developed disaster plans for major rail, air, and highway accidents.

11. Special Features

In Italy, the EMS program includes a model poison control system and the use of mobile hyperbaric chambers for diving accidents.

• LUXEMBOURG

1. EMS Authority/Responsibility

The Ministry of Health coordinates the development of the EMS in hospitals with the Luxembourg Medical Association and the

Entente des Hôspitaux. The Medical and Dental Association has organized permanent physicians services for home medical care on weekends and holidays. The Ministry of Health has placed cars, driven by Civil Defense personnel, at the disposal of the physicians. These cars are equipped with radio-telephone to the central unique number (012).

2. Regional Programs

Luxembourg is organized into three regions -- North, Central, and South. The capital city, also called Luxembourg, is located in the Central Region.

3. Laws and Regulations

Several recent laws and regulations govern the provision of general health care, emergency services, public safety, and security services.

In 1976 a law was passed which established a master plan for organizing health care services. The master plan was based on a national inventory of existing health care needs and resources in each region. The plan also provided for the classification of all health facilities and defined the operational aspects and procedures for departmental activities.

In August 1979, Grand-Duchal regulations were passed that define the standards to which hospital establishments must conform in order to participate in the emergency services, as outlined by the Ministry of Health. Another law, passed in November 1978, deals with the Emergency Medical Services. Its objectives are to regulate the transportation of emergency cases to the hospital and to regulate emergency care providers.

4. Education Programs

A variety of groups offer education and training programs for industry, the general public, and students of all ages. For example, the Accident Prevention Association, Industial Section, makes use of radio to promote accident prevention programs and organizes courses at training centers and at the workplace, sometimes making use of outside specialists. Other media are used to teach first aid techniques to affiliated industries.

Other organizations are involved in promoting or providing courses in the schools. The Red Cross, for example, gives first aid programs to school children, and the Luxembourg Highway Safety Association recently proposed a driver training course for secondary schools.

5. Emergency Communications

Radio frequencies have been allocated for use by Civil Defense, the Police, the Gendarmarie, and for liaison with hospitals. Frequencies are sufficiently broad to permit other services to use them, too. Citizens access emergency services by telephone. Roadside call boxes are located on most major roads. The unique central telephone number, 0I2, of the civil defense, may be called from any place and it can alert the emergency centers where emergency ambulances are located.

6. Transportation (Ambulances and Other Vehicles)

Federal regulations require ambulance vehicles to comply with certain specifications, which cover sirens, lights, etc.

7. Hospitals

In 1979 the Minister of Health outlined standards for medical care facilities wishing to participate in the EMS system. These standards were later formalized in a Grand-Duchal regulation, dated August 1979.

The main hospital in the City of Luxembourg corresponds to U.S. Level I of categorization. The other hospitals in the Emergency Medical Service are U.S. Level II. The country does not have a center for serious burns but has an agreement with the Burn Center at Metz, France, which is located 60 km. from the capital.

The Minister of Health reserves a certain number of emergency beds in different regions of the country for acute medical cases or disaster situations. Certain clinics and hospitals have full-time emergency services; others take turns handling emergencies on weekdays or weekends.

8. Personnel

No special training in EMS care is available for nurses or doctors except for EMS specialists, who receive training in anesthesiology and resuscitation. Although interest in advanced training is growing in the medical community, little has been done about reinforcing training requirements except for participation at a conference on acute intoxication in March of 1980.

Luxembourg has training programs for ambulance attendants covering such topics as shock, asphyxia, various types of injuries, transportation, and infection control.

9. Data Collection

Civil Defense in the Ministry of the Interior collects some information on emergency calls, and the Ministry of Health collects hospital data.

No research is currently underway.

10. Disaster Plans

Hospitals in Luxembourg have no formal plans for receiving victims in the event of a major disaster. A working group is developing a plan for dealing with mass casualties.

11. Special Features

Luxembourg is working with the European Community on Reciprocal Health Assistance, which is forming plans for dealing with disasters, major accidents and exceptionally grave illnesses.

• NETHERLANDS

1. EMS Authority/Responsibility

In the Netherlands, the Minister of Public Health and Environmental Hygiene is responsible for the overall operation of the health system. Reporting to him is the State Supervisory Public Health Service, which, in turn, appoints inspectors to ensure the adequate operation of health services including ambulance services.

Planning, organizing, administering, and supervising ambulance services within the provinces rests with the Provincial Executive Councils, in consultation with the inspectors. Municipalities or consortia of municipalities, in turn, provide for central points (dispatchers), which operate the day-to-day ambulance services. The person in charge of the central point authorizes trips and may also request help from other central point authorities. The Provincial Executive Councils issue licenses for ambulance operators.

2. Regionalization Programs

The Netherlands is divided into 50 areas with populations varying in size from 24,000 to over 1,000,000. The number of ambulances in each service area varies from one per 20,000 people to one per 30,000. Each area designates one central point to coordinate and operate ambulance services.

3. Laws and Regulations

The EMS system is regulated by the Ambulance Transportation Act of 1971. It is administered by the National Health Institution. There are also various acts which cover mutual agreements for special situations. For example, the Joint Arrangement Act addresses services shared between municipalities or provinces. Another act responding to similar special situations is the Municipalities Act.

4. Information/Education

The Ministry of Traffic and Public Works, the Ministry of Defense, and the Ministry of Education all provide prevention programs. The programs discuss accidents occurring at home, on the road, in industry and in school. In addition, the Central Ambulance Station gives public instruction on methods of accessing the EMS system. The Industrial Plant Emergency Medical Care Teams provide first-aid courses for business and industry.

The Netherlands does not have any programs for specific audiences concerning the country's emergency medical services.

5. Emergency Communications

Requirements for emergency communications are covered in the Ambulance Transport Act, particularly with respect to defining the central role of control ambulance stations. The Ministry of Traffic runs a "radio control service," which has its own national frequency. There are nine frequencies for ambulance services.

6. Transportation (Ambulance/Emergency Vehicles)

The EMS system in the Netherlands is regulated by the Ambulance Transport Act, passed in 1971 and fully operative since July 1979. The main role of the Act is to approve treatment for acute care in out-patient situations (home, road, scene of the accident). Each of the Netherlands' eleven provinces is responsible for complying with the Act in accordance with its local situation. To date, the provinces have 50 ambulance regions to handle emergency cases.

In each region a "Central Ambulance Post" (dispatch center) is set up for coordinating the ambulance services. Currently the country has 49 municipal ambulance services, 137 private ambulance services, and 20 Red Cross ambulance stations. The Central Ambulance Posts are mainly located in the municipal health facilities. Where a municipal health facility does not exist, the Central Post is frequently located at the Fire-Brigade.

There are currently 737 ambulances operating in the Netherlands, which serve a population of approximately 14 million people. Helicopters are not yet used to support the emergency land vehicles.

The Ambulance Transport Act authorizes the provinces to establish standards for the number of ambulances. However, the Act specifies the design, fittings, furnishings, and inspections of ambulances, the numerical strength and nursing ability, and the certification requirements for ambulance attendants and the readiness of ambulances and attendants.

Regulations for emergency transport vehicles fall under the Ambulance Transport Act and within the sphere of the Ministry of Transport. The rules may specify standards for different categories of ambulances. The Ambulance Transport Act also establishes requirements to ensure sufficient ambulance services and delineates the proper methods for recruiting and licensing ambulance operators. Inspection is entrusted to the Chief Inspector, other inspectors, and officials working under order from the State Supervisory Public Health Service as well as officials appointed by the Minister of Transport.

Ambulance attendants are trained male nurses and paramedics.

7. Hospitals

By regulation, hospitals in the Netherlands are divided into three categories. Categorization depends on the number of beds and the variety of specialists in the medical facility. There are no hospitals in the Netherlands which are exclusively emergency hospitals.

8. Personnel

There are no specific courses or certification requirements for emergency services personnel other than the items discussed under item (6) above. Nurses are trained in all the areas shown under item 8.2 of the survey. They are also trained in cardiopulmonary resuscitation, neurosurgery, cardiology, obstetrics, psychiatry, and burns treatment.

9. EMS Data Collection

According to the Ambulance Transport Act, the Minister of Public Health and Environmental Hygiene can order ambulance services to provide data about their activities. A suitable form for recording these data is now being prepared.

10. Disaster Plans

Currently, the Netherlands is developing municipal and hospital disaster plans, including procedures for ambulance services. Also, specific emergency plans for airfield and railroad disasters are being prepared. These plans include the formation of traumatology teams.

11. Special Features

The establishment of 24-hour traumatology teams for special emergencies is a special feature of the EMS system in the Netherlands.

• PORTUGAL

1. EMS Authorities/Responsibility

When Portugal's new EMS system is in operation, hospital emergency units will be governed by the state system. Ambulance services, on the other hand, will be directed by the National Ambulance Service.

2. Regional Programs

The EMS system in Portugal, a relatively small country, is organized on a regional basis with three regions for services, North, South, and Central.

3. Laws and Regulations

The two principal laws and regulations governing emergency medical services are the National Ambulance Service Public Law and the Ministerial Resolution, which established the Cabinet for Emergency Medicine. An Institute of Emergency Medicine is currently being proposed, for location within the Ministry of Health and Social Affairs.

4. Public Information and Education

Portugal has specific campaigns for accident prevention which include programs for the prevention of road accidents, the handling of emergencies at sea, and the prevention of accidents at the work place. First aid programs are operated by the Red Cross. Other EMS prevention programs are aimed at high school students.

5. Emergency Communications

In addition to the "115" central emergency telephone system, Portugal has a number of SOS call boxes for responding to emergencies in more sparsely populated rural areas. The SOS calls are relayed to the local police or fire departments. Portugal's response did not indicate whether specific radio frequencies are established for medical emergencies or civil defense emergencies in addition to the police radio communication frequencies.

6. Transportation (Ambulances and Other Emergency Vehicles)

The central government funds a national ambulance service, which was organized in 1975. Funding is based upon a one percent surcharge on certain classes of insurance, (automobile, life, and accident). Standards for ambulances and equipment have been developed at the national level.

7. Hospitals

Hospitals in Portugal are certified to receive emergencies, but there is no specific designation of hospitals or categorization by levels or specialties.

8. Personnel

Portugal does not have requirements for special training or certification of any of the personnel involved in emergency medical services with one exception. Ambulance attendants and members of the police and fire fighting forces are required to complete basic first-aid courses. Special training programs for health care personnel in emergency medical care procedures are currently being proposed.

9. EMS Data Collection

The responsibility for EMS data collection rests with the National Ambulance Service and the Civil Defense Organization, which is currently being organized. Both the National Ambulance Service and the Cabinet for Emergency Medicine can sponsor EMS research. In the future, data will be collected through the Institute of Emergency Medicine and in the Health Department.

10. Disaster Plans

Portugal is beginning to organize a National Civil Defense System. No guidelines or policies are established for institutional or community disaster planning.

- UNITED KINGDOM

1. EMS Authority/Responsibility

The Secretary of State is the ultimate authority responsible for emergency medical services. National EMS policy guidelines are developed by the Department of Health and Social Security.

The major responsibility and authority for planning, organizing, staffing, and day-to-day operations of the emergency medical services rests with regional health authorities, who, in turn, delegate many of these responsibilities to area health authorities. In only seven cases do Regional Health Authorities become directly involved in the operations of the ambulance services: in the Greater London District and in the six other metropolitan urban areas in England.

The Home Office has a general responsibility for the police and fire services in England and Wales and, therefore, can have some effects on disaster planning.

2. Regional Programs

This country, by definition, is organized on a regional basis, with Regional Health Authorities and Area Health Authorities reporting to them. The sizes and populations of each region, however, vary greatly. Regional Health Authority populations range from 2,000,000 to 5,000,000 people. Area Health Authorities represent from one to six districts, each having a population between 150,000 and 300,000. The populations covered by ambulance services, however, also vary -- from 7,000,000 in the London Ambulance Service to about 350,000 in smaller regions.

In urban areas such as the Greater London Area, and in the more populated regions, rationalization (limiting the availability of accident and emergency services) can be practiced, so that each hospital accident and emergency service unit can service a population of 150,000 or more. In the less densely populated parts of the country, however, rationalization is more difficult because of the large distances that each unit must cover to serve 150,000 people.

3. Laws and Regulations

Although the United Kingdom has no specific laws and regulations covering emergency medical services, these services come under the general authority of the National Health Services Act. Under the provisions of that Act, the Department of Health and Social Security issues specific guidelines for accident and emergency services. These documents include ambulance, vehicle, and equipment specifications; ambulance service and communications specifications; and ambulance training specifications. Radio frequencies are allocated separately.

4. Public Information and Education

The Royal Society for the Prevention of Accidents and the Health Education Council are responsible for accident prevention programs. However, comprehensive health education is a specific responsibility of the Health Authority. St. John's Ambulance Association and the British Red Cross Society are responsible for first-aid training.

5. Emergency Communications

The United Kingdom has a universal 999 system that can be used by any member of the general public in an emergency situation (and also by general practitioners in non-urgent situations). The Post Office Telephone Exchange is responsible for handling 999 calls.

Health authorities are given priority in the installation of radio linkages with ambulances to more readily dispatched ambulances to EMS facilities. Thirty channels in the VHF high band are allocated for ambulance use. An additional channel has been designated as the "emergency reserve" channel. In addition, four other channels are assigned for use by non-ambulance health services. The authority for radio frequency designation is the Home Office. The "emergency reserve" channel is used to enable ambulances from different areas to be controlled on one channel while at the scene of a major accident.

In addition to the above, private circuits connect the ambulance control station to police and fire departments, health centers, and hospitals, including the hospital ambulance liaison officer.

6. Transportation (Ambulances and Other Emergency Vehicles)

The Department of Health and Social Security has established national handwritten standards for vehicle design, identification, and equipment. However, Regional and Area Health Authorities are permitted to deviate from these standards. In all instances, the specifications for vehicles and telecommunications equipment are issued as guidelines rather than as strict policies. Thus the ambulance services' telecommunications document is listed as "detailed technical advice." The final authority to expend funds for specific pieces of equipment rests with the health authority concerned. The Purchasing Advisory Group for Ambulant Vehicles and Equipment is responsible for developing these standards.

There are no standards for special vehicles except in local circumstances, which appear to be restricted to the Brighton area. (In this area, the cardiac scheme operates on an experimental basis.)

The United Kingdom has no standards for air or sea rescue vehicles.

7. Hospitals

The only designation underway is the rationalization referred to above, in which accident and emergency services are provided only in certain hospitals so that each of these services has sufficient work to keep it busy. (Exceptions of course would take place in isolated rural situations.)

8. Personnel

In the United Kingdom, the development of physicians specializing in treating accident and emergency cases is growing rapidly. In 1977, there were 100 EMS medical consultants on the job. The organizational structure of emergency medical services in the United Kingdom was impacted profoundly by a report prepared by a subcommittee of the National Health Service in 1962. The report, referred to as the Platt Report, made wide-ranging recommendations for the reorganization of hospitals, ambulance services, and health care personnel. Specific recommendations were made concerning: (1) the rationalization of accident and emergency services; (2) the construction, staffing, and organization of hospital accident and emergency units; (3) the provision of accident and emergency beds within hospitals (30 to 35 per 100,000); (4) the duties of various medical personnel; (5) the designation of specific centers for burn treatment; and (6) the need to educate the public in prevention.

As a result, the Royal College of Physicians and the Royal College of Surgeons produced a training program for senior registrars, which included training in cardiovascular emergencies, respiratory emergencies, general surgery, orthopedic surgery, neurosurgery, plastic surgery, poisoning, psychiatric cases, pediatric emergencies, and general practice. For EMS specialists, experience in treating the following is considered essential: soft tissue injuries and infections, hand infections and fractures, and diagnosing ophthalmic and ENT conditions. Experience in abdominal emergencies, gynecological emergencies, multiple trauma and resuscitation, and administrative and teaching experience are also required. A&E specialist accreditation is open to those who complete the training program.

The United Kingdom has also established post-basic courses for both registered and enrolled nurses. These courses lrad to specific certification.

The National Health Service includes four advisory, or staff, committees and the National Training Council. These advisory committees, in turn, oversee committees for nurses, midwives, and ambulance personnel. The staff committees report to the Secretary of State on matters concerning recruitment, training, and development of the particular staff group concerned. The Training Council, on the other hand, advises on the general strategy, development, and coordination of training programs to be managed by the National Health Service.

There are currently twelve special schools for ambulance attendants, under the control of the Regional Health Authorities. There is some consideration being given to reducing this to four schools. However, if the number of schools is reduced, they may become answerable to a consortia of Regional Health Authorities.

Courses for ambulance attendants include six weeks of basic training and two weeks of refresher courses every three years. A few ambulance attendants are taking advanced training in techniques of cardiac resuscitation, including interpretation of EKGs, defibrillation, intravenous infusion, and intubation. This is still subject to evaluation.

Public health authorities and the Royal College of Nursing are responsible for developing special EMS courses for nurses.

Most of the emergency medical training for medical students is part of their basic training and remains the responsibility of the universities. Similarly, most of the courses in special postgraduate programs are the responsibility of the university and the Royal College of Surgeons.

9. EMS Data Collection

In the United Kingdom, responsibility for collecting and compiling EMS data rests with the Regional and Area Health Authorities, who forward some statistics to the Department of Health and Social Security.

The responsibility for funding and coordinating research projects and reports is divided between the Medical Research Council and the Department of Health and Social Security. The Medical Research Council is interested in doing more research work on improving data collection; studying the association of psychological factors and road accidents. In addition, the Council is interested in doing studies on the causes of domestic accidents in which children are involved, and accidents involving the elderly. Other research areas of interest are the effect of treatment and the development of more reliable long-term indicators of outcome as well as the management of multiple injuries involving more than one vital body system (where the ideal therapy for one system is in conflict with the ideal therapy for another).

Private research groups (e.g., the Nuffield Foundation) and the drug companies are involved in EMS research.

10. Disaster Plans

The Department of Health and Social Security issues guidelines for developing health service plans to deal with major accidents. Preparation of the plans is primarily the responsibility of Area Health Authorities. Regional Health Authorities are responsible for coordinating the plans among the service areas, particularly where geographic boundaries overlap. Also, each Regional Health Authority maintains lists of hospitals with the necessary capabilities to receive casualties on a 24-hour basis.

Planning for major disasters such as the transportation of dangerous chemicals is undertaken on a voluntary basis. There are no specific national requirements for preparing plans to respond to rail, air, or highway disasters.

11. Special Features

New Cross Hospital in London has established a centralized poison information service. In some parts of the country, general practitioners are organizing teams of physicians to provide on-the-spot medical care for road accident victims. The parent organization (British Association of Immediate Care) is supported financially by the Department of Health and Social Security.

• UNITED STATES

1. EMS Authority/Responsibility

The overall Federal EMS program for the pre-hospitalization and hospitalization phases is administered by several branches of the U.S. Department of Health and Human Services (Public Health Service, Health Services Administration, Bureau of Medical Services, Emergency Medical Services Division). Transport during the pre-hospitalization phase is administered by the U.S. Department of Transportation.

Numerous other federal agencies and county, state, regional, and local agencies also set guidelines and develop accident prevention and EMS training programs.

2. Regional Programs

Although 304 EMS regions have been mapped out in various areas of the United States, geographic boundaries have not yet been clearly defined.

3. Laws and Regulations

The Emergency Medical Services Act of 1973 (Public Law 93-154), amended in 1976 and 1979, covers federal grant programs that fund comprehensive regional EMS systems.

4. Education Programs

Several federal agencies operate home safety programs -- the National Safety Council, the Consumer Products Safety Commission and the Food and Drug Administration (Division of Poison Control). The College of Orthopedic Surgeons and the American Red Cross run similar programs.

Highway and road safety is promoted by the National Highway Traffic Safety Administration.

Accident prevention and safety programs for the workplace are promoted by the Occupational Safety and Health Administration, the National Bureau of Mines and the Environmental Protection Agency (the latter particularly with regard to pesticides). Among nonfederal agencies, the Lions Clubs have been prominent in promoting eye safety.

The Department of Education is the primary federal agency for conducting safety programs in schools. The American Red Cross and the YMCA also sponsor water safety programs for young people.

In the private sector, in areas where a "911" system is operative, the telephone company is responsible for promoting its use. However, fire departments and the American Red Cross also sponsor programs for informing the public about accessing the emergency medical system.

All of the above public education programs are carried out at the national level. Many other safety, accident prevention and first-aid programs are provided by county, state, and sub-state agencies and organizations, both public and private.

For example, most public schools are organized on a county level. There usually will be a safety coordinator to determine training needs for school children. Generally the educational courses include programs on CPR, minor first-aid, and accident prevention. The Federal Drug Enforcement Administration and the Consumer Product Safety Commission produce materials to supplement local school course offerings.

The Red Cross, the American Heart Association, and the Department of Transportation conduct first-aid courses for business and industry. Trade unions promote these work safety and first-aid programs for their membership.

Training programs for paramedics are provided to the military, volunteer fire departments, and police personnel.

5. Emergency Communications

Ten duplex channels are available exclusively to EMS systems. Communications centers, ambulances, and hospital emergency rooms have full frequency capability. These communications centers also have public telephone interface and direct lines linking various agencies and other radio frequencies.

A "911" system currently operates in many areas of the U.S., but its adoption has been slow because of the many small, privately-owned telephone companies existing in this country.

6. Transportation (Ambulances and Other Emergency Vehicles)

Federal standards for ambulance vehicles were established by the Department of Transportation in 1974 and revised in April 1980. They encompass the design, size, construction, equipment, and identification markings of the vehicles. Identification consists of an orange band and a DOT Star of Life superimposed on a white background. Specifications for lights and signs denoting the special nature of the vehicle (e.g., "Paramedic") are also included.

Other vehicles used for mass casualties or cave-in rescue are not covered by these standards.

Air and sea rescue vehicles are also not standardized. The Armed Forces' MAST Program (Military Assistance to Safety and Traffic) has standards for communications and personnel, but aircraft and equipment vary. DOT is in the process of developing guidelines for air ambulances.

7. Hospitals

The current thrust to categorize and regionalize hospital trauma critical care services is being carried out by the Committee on Trauma of the American College of Surgeons and the EMS Division of the Department of Health and Human Services (DHHS). The federal guidelines are not regulatory in nature and compliance is progressing.

8. Personnel

The U.S. Department of Transportation has developed training courses for ambulance personnel, dispatchers, and first-responders, which are periodically revised. Professional associations provide training and certification criteria, on which registration for a wide variety of EMS specialities is based.

9. EMS Data Collection

The Division of Emergency Medical Services in DHHS has recently developed a management information system called the Regional Emergency Medical Management Information System (REMMIS). The purpose of REMMIS is to improve the assessment of federal EMS grant programs. The system will provide well-defined and pertinent information on each of the 304 regional EMS systems.

Both the U.S. Department of Health and Human Services and the Department of Transportation fund and coordinate EMS research projects and reports. Other research projects are funded through the National Center for Health Services Research. There is no central directory for such research, thus information on specific research projects must be obtained from each funding agency separately.

10. Disaster Plans

The Federal Emergency Management Agency (FEMA) has developed policy guidelines for mass disasters. Other aids have been developed by the American Hospital Association. In addition, the Nuclear Regulatory Agency requires mass evacuation plans for areas near nuclear reactors.

Hospitals prepare plans biannually in cooperation with regional EMS programs and county disaster-planning agencies. These plans are reviewed by the Joint Commission on the Accreditation of Hospitals, which also requires annual exercises.

11. Special Features

Some of the special features of the United States' EMS systems are: ambulance standards, hospitalization phase technology for speciality and trauma capabilities, communications technology with telemetry and repeater (or relay) linkages, regional poison information control, citizen CPR training, and specialized training for advanced cardiac and trauma care.

SUMMARY TABLE OF RESPONSES TO CCMS/EMS 1980 SURVEY

EMS Survey Number	COUNTRIES / RESPONSES (7)	BELGIUM	CANADA	FRANCE	GREECE	ICELAND	ITALY	LUXEMBOURG	NETHERLANDS	PORTUGAL	U.K.	U.S.
1.	Source of Prime National Responsibility Indicated	Yes	Yes Adv. (1)	Yes	Yes	Yes	Yes	Yes	Yes Adv. (1)	Yes	Yes Adv. (1)	Yes Adv. (1)
2.	EMS Organized on a Regional Basis	No	Partly (2)	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3.	Countries with EMS Laws or Regulations	Yes	Partly (2)	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes (3)	Yes (4)
4.1	Education of General Public	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.2	Education for Specific Audiences	Yes	Yes	No Reply	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5.2	EMS Dedicated Radio Frequencies	Yes	Partly (2)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6.1	Ambulance Vehicle Design Standards	Yes	Partly (2)	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes (4)
7.	Hospital Designation or Categories	Note (2)	Proposed	Yes	No	Note (5)	Yes	Yes	Yes	No	Note (5)	Yes
9.1	Central Data Collection/Statistics	Yes	Note (2)	Partial	No	Yes	No	No	Yes	Yes	Yes	Yes

NOTES:
(1) National guidelines are of an advisory nature: No direct authority.
(2) In some provinces or states.
(3) Part of National Health Service
(4) Grant funding program.
(5) Partial designation: either by specialty or by size (regional, local). (SEE RESPECTIVE TEXTS)
(6) Hospital emergency visits by national agency; ambulance statistics by provincial agencies
(7) In all cases responses interpreted liberally: "Yes" answers do not imply comparable programs.

APPENDIX C

LIST OF PRINCIPAL EMS EXPERTS WHO CONTRIBUTED TO THE CCMS/NATO PILOT STUDY ON IMPROVING EMERGENCY MEDICAL SERVICES

LIST OF PRINCIPAL EMS EXPERTS WHO CONTRIBUTED TO THE CCMS PILOT STUDY ON IMPROVING EMERGENCY MEDICAL SERVICES

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APPENDIX D

EMERGENCY MEDICAL SERVICES SYSTEMS IN THE UNITED STATES

EMERGENCY MEDICAL SERVICES SYSTEMS IN THE UNITED STATES

Additional information on the following topics, prepared by Dr. David Boyd, Director of Emergency Medical Services in the U.S. Department of Health and Human Services gives a more complete picture of EMS systems in the United States: (1) The Emergency Medical Services Act of 1973; (2) Emergency Medical Care Issues; (3) EMS Systems Development; (4) EMS as a Component of the Total Health Care Delivery System; (5) EMS Systems Management; (6) The EMS Lead Agency; and (7) EMS Data Collection and System Evaluation.

THE EMERGENCY MEDICAL SERVICES SYSTEMS ACT OF 1973

The passage of the Emergency Medical Services Systems (EMSS) Act of 1973 (P.L. 93-154) by Congress* has provided the mechanism and funds for communities to develop regional emergency medical services delivery systems across the nation. With the passage of the EMSS Act, the U.S. Congress mandated that the emergency medical care programs funded with federal dollars must address, plan, and implement a "systems approach" for the provision of emergency response and medical care. In the EMSS Act, some fifteen component requirements have been identified to assist system planners, coordinators, and operators in their attempts to establish comprehensive, areawide and regional EMS programs. These components are listed below.

1. Provision of manpower
2. Training of personnel
3. Communications
4. Transportation
5. Facilities
6. Critical care units
7. Use of public safety agencies
8. Consumer participation
9. Accessibility to care
10. Transfer of patients
11. Standard medical record keeping
12. Consumer information and education
13. Independent review and evaluation
14. Disaster linkage
15. Mutual aid agreements

The Division of Emergency Medical Services (DEMS), Department of Health and Human Services (DHHS), the established federal lead agency, has developed Program Guidelines in which under Chapter III,* "Special Program Guidance," the clinical significance of the systems approach in developing an EMS system is described. While an EMS system must respond to all declared emergency calls within its appropriate geographic region (including the nonemergency 80 percent, the truly emergent 15 percent, and the critical cases -- 5 percent), there has been a special identification of those well identified critical patient groups which demand a competent system for survival. It is to the survival of these critical patients (trauma, burns, acute cardiac, high risk and premature infants, poisonings, psychiatric, drug and alcohol overdose) that a "system" conceptualization and initial system efforts must be directed in order to ensure the development of a sound, medically competent, and comprehensive EMS system.

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* Public Law 93-154: Emergency Medical Services Systems Act of 1973. 93rd Congress, 5.2410. 1973; Law of 93rd Congress: Emergency Medical Services Systems Act of 1973, Public Law 93-154. Washington, D.C., 1976; Law of 94th Congress: Emergency Medical Services Amendments of Public Law 94-573, Washington, D.C., 1976.

EMERGENCY MEDICAL CARE ISSUES

The central theme and intent of the EMSS Act is to develop systems of emergency medical care that would significantly decrease current death and disability rates. The goal of the national EMS program is to initiate regional planning and integration of the fifteen mandatory components so as to provide the essential and appropriate EMS emergency and critical care services for all emergency patients.

The current EMS patient problem is compounded by the 65 million citizens who enter the system each year. At least 80 percent of these patients cannot be considered "true medical emergencies." Another 15 percent are real emergencies which require urgent care (i.e., minor trauma, infectious diseases, and other acute general medical and surgical problems). The remaining 5 percent are the critically ill and injured patients. This last group was not salvageable only a few years ago, but today these lives can be saved if initial, definitive, and rehabilitative care is given in time and the patient is moved through the regional system and provided essential medical care.

Specific planning and regional EMS response to the particular critical care categories assumes that, in time, all critical medical emergencies will receive better care, and will benefit from sound regional EMS systems planning and operations.

Likewise, certain local occupational and/or recreational hazards must also be addressed with a goal toward prevention. These special target patient groups provide each regional system with an opportunity to develop evaluation criteria for systems performance and patient outcomes (distribution and survival).

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* Emergency Medical Services Systems: Program Guidelines. U.S. Department of Health and Human Services, Health Services Administration, Division of Emergency Medical Services. Revised 1975. (HSA-75-2013).

EMS SYSTEMS DEVELOPMENT

Each regional emergency medical services plan must include a description of the general and specific protocols for the emergent and nonemergent patients in its delivery system. It must also include a detailed explanation of care and triage patterns for critical groups by identifying the patient treatment needs as well as the involvement of the systems operational components (vehicles, telecommunications, manpower, facilities). These care patterns will depend upon the clinical patient demands, the sophistication of the transportation capability, the level of care during transportation, the communications coordination, the delivery to a categorized general hospital or designated critical care facility, and the migration into the rehabilitation phase. These patient care programs must be established with appropriate backup relationships by written arrangements among the various provider elements in order to ensure a sound and competent regional EMS system.

When an individual becomes seriously ill or injured it is manifested in a specific way. People have accidents. They have heart attacks. They are burned. They have problems at birth. They are poisoned with alcohol, drugs, or other toxicants. They have emotional disturbances resulting in varying degrees of psychiatric instability. The planners of EMS systems must consider the general patient population and these easily identifiable and significant critical patient groups that exist within the geographic regional area. An indepth knowledge of the demography, epidemiology, and clinical requirements associated with these critical patient groups is mandatory to effective EMS planning and operations.

In many circumstances the initial patient access, response, and transportation considerations are general in nature until the severity of the patient's (diagnostic-specific) problem becomes clarified. As soon as this clarification develops, a rather specific patient treatment and triage plan must be activated to include the prehospital, hospital, interhospital phases, as well as the specialty care unit and later the specific rehabilitation services necessary for each illness and injury.

It is now a fairly well accepted position across the country that initial and definitive medical care for each of the target patient groups can be improved, and most of these patients can be salvaged by an effective EMS system. The design of an EMS system will need to include certain organizational and operational changes. There must also be additional adaptations of treatment in the prehospital, hospital, and interhospital phases with proper modification of existing and new technology that will enable paraprofessionals, and professionals to successfully manage and treat all emergent problems at the scene and during movement through the system, whether they occur in urban, metropolitan, rural, or wilderness areas.*

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* Selected Bibliography: Rural Emergency Medical Services. U.S. Department of Health and Human Services, Health Services Administration, Division of Emergency Medical Services. Revised 1975. (HSA-75-2013).

The development of an EMS system usually starts with an initial upgrading of existing resources and then progresses through periods of increasing sophistication. That is, following the establishment of a basic life support (BLS) system within the region, there usually is a logical progression to the advanced life support (ALS) system due to the increasing capabilities of the EMS region.

EMS AS A COMPONENT OF THE TOTAL HEALTH CARE DELIVERY SYSTEM

The coordination of established medical services and public safety efforts brings the emergency medical care program to an interface with community service activities heretofore outside the scope of established medical practice. Community involvement by a wide spectrum of the public, private, and governmental entities gives an emergency medical services system a new dimension to health care that has not previously been a major consideration in American medical practice. An additional result of the regional EMS system effort will be the demonstration of how other essential nonemergent health services and programs might be stylized similar to EMS on a geographic and service demand basis. Some experience already suggests that programs such as blood, organ transplantation, and rehabilitation services as well as quality assurance programs might be enhanced by regional systems models.

The national EMS system effort will improve the quality of care for the critically injured and ill citizens across the country. Due to its unique characteristics, emergency medical care provides a rare opportunity for experiences in many other phases of health care delivery. It is anticipated that the "ripple effect" in the EMS effort may extend beyond the limits of acute care phases to many functional component areas.

The success of any EMS system is dependent upon the wisdom of its leadership and appropriate integration of resources, operations management, and financial planning into an effective program. The major task of the Division of Emergency Medical Services is to provide current and timely technical assistance and guidance by communicating results of lessons learned from established and ongoing operational EMS projects.

EMS SYSTEMS MANAGEMENT

National experience with public and private funds has demonstrated that a few strategic factors are paramount to successful operations and management of an EMS system effort. The following elements must be addressed in order to develop and maintain an integrated total EMS system.

- Action Plan for EMSS Area -- A comprehensive, detailed, and progressive plan must be created for establishment, operation, and expansion of the EMS system.

- Lead Agency -- A lead agency must be identified as the responsible operations unit for the EMS system, including grants management control and operations coordination of the involved community and regional organizations and resources.

- Financial Support -- Appropriate means of financial support for initial and continued EMS operations must be considered. Such financial support may be derived from various federal programs, state and local funds, general revenue sharing funds, third-party payments, and direct payments from patients.

The intent of the EMSS Act is to fund EMS projects on a multigovernmental and multicommunity basis. At the present time there are a few regions in the country where an "ideal" appropriate regional health authority exists. Such an organization or special health consortium must be developed usually with reliance on the established state health office (or major Metropolitan Health Agency) with its established management and regulatory capability for successful program initiation and support.

THE EMS LEAD AGENCY

As a public health initiative the EMS system must be accountable to the public as well as health professionals for program effectiveness and appropriateness. In this regard a lead agency, under the auspices of the health authority, works to insure system medical control and overall program accountability.

The EMS lead agency serves as a focal point for system configuration design for all types of emergencies and all phases of the EMS system. This lead agency must be responsible for the conceptual design of the EMS system. Regional EMS planning and medical care programs must have input from credible physicians appointed by the lead agency's medical director. The actual systems operations by various medical and public safety providers must be in conformance with the EMS systems operations policy as established by the lead agency. This is accomplished by the lead agency's acceptance of responsibility for all EMS patients and by establishing protocols based on sound professional standards and practices developed through appropriate technical committees, medical societies, professional consultants, and lay/professional advocacy groups. The administrative (off-line) medical director of the lead agency delegates most on-line and some off-line responsibility in accordance with certain regulations, standards, and established policies for the EMS system (e.g., advanced life support (on-line) medical control, specialty care protocols, etc.). The clinical validity of each of the clinical subsystems (e.g., trauma, cardiac, poisoning) and the integration of the 15 systems components is the prime responsibility of the EMS lead agency's off-line medical director. The EMS lead agency provides medical accountability. For example, the lead agency:

- Designates an administrative (off-line) medical director who is responsible for the overall planning and development of a medically sound EMS system for regional prehospital, interhospital, and hospital care programs

- Develops regional medical control plans, including the designation of a resource/base station, associate/receiving hospitals, and advanced critical care centers
- Develops the regional and areawide treatment, triage, and transfer and operations protocols
- Designates supervising ALS (on-line) medical director physician for resource/base station hospital to establish and direct medical control of prehospital care in each region/area
- Directs the implementation of communications technology to link field paramedics with resource/base hospital physicians and resource/base hospital with associate/receiving hospitals and other critical care centers
- Determines "scope of practice" roles of each EMS systems provider
- Establishes competency criteria and competency maintenance programs for EMS systems providers
- Establishes evaluation methods for maintaining program review and accountability (records, case review, audits, etc.) for all clinical care programs and to monitor program effectiveness and impact on patient death and disability

State and regional lead agencies must be responsible for the overall coordination and management of entire regional EMS systems, including cooperation between communities, system operations, and organization of regional resources. The lead agency must have the medical and technical expertise to provide essential technical assistance appropriate to their respective regional EMS systems. Some lead agencies will have various additional regulatory responsibilities (e.g., certification of EMS system personnel, ambulance licensing, etc.) and some will have direct operational responsibilities (e.g., ambulance and/or dispatch services).

The administrative off-line responsibilities of the lead agency must be clearly understood by all concerned for effective interlevel communication and coordinated operations within regional systems. The success of the EMS system lead agency is dependent upon the wisdom of its leadership, the soundness of the medical care program, an informed and responsive community, and appropriate integration of components, resources, operations, management, evaluation, and financial planning.

EMS DATA COLLECTION AND SYSTEM EVALUATION

The Division of Emergency Medical Services in DHHS has recently developed a management information system called the Regional Emergency Medical Management Information System (REMMIS). The purpose of REMMIS is to improve the assessment of federal EMS grant programs. The system will provide well-defined and pertinent information on each of the 304 regional EMS systems.

REMMIS will provide data which describes the current capability of each component and each clinical area of an EMS system. The data will describe changes in the capability of each area over a four-year period. The system will enable the Division to perform select analyses and provide evaluation material to the Administrator in a consistent and reliable manner.

REMMIS will identify, collect, and maintain comparable information on EMS regional systems. It will assist states to better monitor and assess their EMS systems capabilities for operational and budgeting purposes. It will also greatly assist regional office to monitor and critique progress and performance against the stated grant objectives at various times during the grant period.

An annual report will be prepared summarizing the information collected. It will include a review of the components and resources among EMS regions at the planning, basic, and advanced levels of operational implementation; the volume of patients in all critical care groups impacted by the EMS; and reported changes in patient care outcomes.

Until REMMIS was instituted it was difficult to determine how many lives were being saved and the amount that disability was being reduced because of EMS systems. Formerly, evaluation of the emergency medical care programs was geared toward the survey approach, resources documentation, and data on sub-systems (e.g., transportation, training, etc.).

It is essential for every EMS system to obtain key data to evaluate the clinical effectiveness of regional EMS systems. New methodologies must be developed for "tracking" and evaluating emergency medical care for specific patient groups (e.g., trauma, burns, etc.) within the system. Analyses of these data will allow programmatic decisions as to the appropriateness of utilization of facilities, personnel, equipment, clinical treatment, and cost-effectiveness.

The following should be the basic ingredients for the development of an evaluation strategy. This is consistent with the relative development stage of most EMS systems at this time. As EMS projects grapple with the multiple components and organizational changes, they must also comprehend the basic precepts of evaluation methodology.

The following are basic to an evaluation strategy:

- Development of a descriptive narrative of the organization's operational components, and "clinical systems" design and implementation. A key evaluation task for each program will be that of the narrative description of the relative systems changes implemented and perceived as the EMS system develops. This essential evaluation component cannot be overlooked and is essential for subsequent steps described below.

- Structural analysis and resource development. In this area one must describe some of the key implementation aspects (radios installed, ambulances placed, etc.) that are well identified phenomena of an EMS program. These will be necessary in the area of organization and management, at least the six clinical tracer and impact groups, and at least one parameter for each of the fifteen components.

  This inventory assessment will describe these key structural phenomena and provide some guidance as to the quality of each parameter (implementation of "911" or similar centralized emergency telephone exchange, dispatch, categorization). Much of these data will include resources data for program information sources. Of these parameters within each of these areas, some will be of state or national significance.

- EMS activities or processes. Those structural components now implemented (e.g., communications, 911 dispatchers, ambulances, trauma units, etc.) all have activity levels which can be counted using operations data; for instance, counting trauma victims admitted to a specialized designated trauma unit, or the numbers of calls via the 911 access number. With this approach even during the initial years, a program will be capable of monitoring the very basic process elements of the system and will be able in future years to develop ratios, indices, and correlations among or between systems components.

  Rates of utilization and appropriate clinical and cost benefit data can subsequently be developed. Data on EMS activities or processes will also have some parameters of national significance but, more importantly, these data will be most useful to the actual operationa, management, and development of each system.

- Patient outcome and program impact. In this section, critical clinical questions must be enunciated in the evaluation strategy. The evolution from simple to complex evaluation approaches will parallel each system's growth and maturity. There are at least four types of impact evaluation essential to documentation of a comprehensive and successful system.